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The digital transformation of advisory practices

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The Faculty of Business, Economics and Informatics of the University of Zurich hereby authorizes the printing of this dissertation, without indicating an opinion of the views expressed in the work.

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Zusammenfassung

Beratungsdienste haben sich lange der Digitalisierung entzogen. Während in anderen Servicebereichen der Computer die Haupt- oder die einzige Ausrüstung wurden, sind die Beratungsdienste immer noch auf Stift, Papier und Broschüren angewiesen. Bankberatung, Versicherungsberatung oder Beratung an einem Amt muten nach 1950er an. Angesichts der hochgradig digitalisierten und einheitlichen Arbeitsabläufe in der Dienstleistungsbranche scheinen die Beratungsgespräche eine Insel zu bleiben. Sie werden jedoch zunehmend unter Druck gesetzt: Gesetzgeber fordern eine ausführlichere Dokumentation, Service-Provider erwarten standardisierte Prozesse und die Kunden wünschen sich eine schnellere, informativere oder ansprechendere Erfahrung. Eine Möglichkeit, all diese Ziele ohne zusätzliche Ressourcen und höhere Arbeitsbelastung für die Berater zu erreichen, besteht darin, die Beratungen mit einem dedizierten digitalen Tool zu unterstützen: mit einem Tool, das Dokumentationsgenerierung, Zugang zu externen Informationsquellen und Integration der Beratung in den digitalen Workflow unterstützt. Jedoch die Befürchtung, dass digitale Tools den menschlichen, high-touch Charakter der Interaktion zwischen dem Berater und dem Kunden negativ beeinflussen könnten, überwiegte bisher. Dieses PhD-Projekt wurde ins Leben gerufen, um diese Befürchtungen und die bereits zuvor beobachteten Interaktionsprobleme zu untersuchen und Vorschläge für die Gestaltung digitaler Beratungstools zu generieren. Diese Dissertation liefert die Erkenntnisse aus fünf Jahren Forschung in zwei Bereichen: Finanzberatung bei Banken und Einbruchdiebstahlprävention von der Polizei. Das Dokument enthält neun Artikel in drei Teilen sowie eine Synopsis und ein Schlusswort.

Der erste Teil konzentriert sich auf das Verständnis der digitalen Unterstützung in Beratungsdiensten. Er identifiziert mehrere Interaktions- und Gesprächsmuster, die die konventionellen und die IT-gestützten Beratungen unterscheiden. Die Ergebnisse weisen auf die zentrale Rolle der Arbeitspraktiken von Beratern hin. Dementsprechend ergeben sich die Interaktionsprobleme aus einer Diskrepanz zwischen den Routinen des Beraters und den im Design implizierten Verhaltensweisen – und nicht aus einem falschen Design oder einer allgemein negativen Einstellung zur digitalen Transformation.

Der zweite Teil vertieft das Wissen über Beratungspraktiken in der Einbruchdiebstahlprävention und im Finanzbereich. Er bietet eine reichhaltige Beschreibung vieler Beratungspraktiken in Bezug auf Konversations-, Material- und Interaktionsverhalten. Die Analyse zeigt, dass diese Verhaltensweisen oft eine implizite, versteckte Begründung haben und eine fundamentale Rolle bei der Interaktion mit dem Kunden spielen: Sie erleichtern das Impressionsmanagement, die Aufrechterhaltung der Beteiligung oder die Überzeugungsarbeit. Daher können nur Designs, die die Routinen und ihre Gründe anerkennen, eine nachhaltige Transformation bewirken.

Der dritte Teil baut auf den obigen Erkenntnissen auf und beschreibt das tatsächliche Design von zwei digitalen Werkzeugen: LivePaper für Hypothekenberatungen und SmartProtector für Einbruchsdiebstahlberatung. Die enthaltenen Artikel beschreiben die einzelnen Systeme, die abstrakten Prinzipien, die das Design bestimmen, die Logik dahinten, sowie die Auswirkungen von LivePaper und SmartProtector auf die Beratungsdienste und auf die Interaktion zwischen den Teilnehmern. Sie zeigen auf, wie die Übereinstimmung zwischen den Beratungspraktiken und Designimplikationen die digitale Transformation von Beratungsleistungen ermöglicht.

Insgesamt liefert diese Dissertation spezifische Beiträge in jedem Teil und in jedem Artikel. Sie alle folgen jedoch der zentralen Erkenntnis: Digitale Transformation ist nicht

so sehr eine Frage des Aufbaus von effektiven digitalen Werkzeugen, sondern erfordert Werkzeuge, die Wert generieren und sich zugleich gut in den Kontext integrieren. Ein grundlegendes Element des Kontexts sind routinierte Verhaltensweisen, Praktiken, mit ihren materiellen, konversationellen, interaktionellen, körperlichen, rationalen und impliziten Aspekten. Diese Perspektive erlaubt es, in der Zusammenarbeit zwischen Menschen den Sinn zu erkennen und die diesem Sinn entsprechende digitale Werkzeuge zu implementieren.

Abstract

Advisory services have long resisted to digitalization. Whereas in other areas of service provision computers have been the main or the only equipment, advisory services still rely on pen, paper and brochures. Advisory services at a bank, an insurance company or a public agency look like they would have looked in the 1950-ies. Given the highly-digitalized and uniform workflows in service industry, advisory services seem to be a land of bliss. However, there is an increasing pressure on them to change: regulators require more detailed documentation, service providers expect standardized processes, and advisees desire a swifter, more informative or smarter experience. A way to reach all those goals without additional resources and higher workload for the advisors is supporting the advisory services with a dedicated digital tool: one that generates documentation, provides access to external sources of information, and helps to integrate the advisory service into the digitally-supported workflow. However, the fear that digital tools could negatively impact the human, high-touch character of interaction between the advisee and advisor prevailed. This PhD project was launched to explore those attitudes and previously observed interaction breakdowns, as well as to generate suggestions for the design of digital tools to be used in advisory services. This dissertation provides the insights collected throughout five years of research in two advisory domains: financial consultancy at banks and burglary prevention encounters offered by police. The document contains nine articles divided in three parts, as well as a Synopsis and a Closure.

The first part focuses on understanding the nature of digital support in advisory services. It identifies multiple interactional and conversational patterns which differentiate the conventional and the IT-supported advisory services. The results point to the central role of advisors' work practices. Accordingly, the breakdowns follow from a mismatch between advisor's routines and the behaviors implied in the design, rather than from a wrong design or general attitude towards digital transformation.

The second part advances the knowledge of advisory practices in burglary prevention and in financial domain. It offers rich description of multiple advisory practices in terms of conversational, material and interactional behaviors. The analysis reveals that those behaviors often have an implicit, hidden rationale and fulfill a fundamental role during interaction with the advisee: they facilitate impression management, involvement maintenance or persuasion. Therefore, only designs that acknowledge the routines and their rationale can generate a sustainable transformation.

The third part builds on the above findings and approaches the actual designs of two digital tools: LivePaper for mortgage advice services and SmartProtector for burglary prevention advice. The articles describe the particular systems, the abstract principles that drive the design, the logics behind them, as well as the effects LivePaper and SmartProtector have on the advisory services and on the interaction between the participants. They illustrate how the fit between the advisory practices and design intentions enables for digital transformation of advisory services.

Overall this dissertation makes specific contributions in each part and in each paper. However, they all share the central insight: digital transformation is not so much the matter of building effective digital tools, but it requires tools that generate value while integrating well into the context. A fundamental element of the context are routinized behaviors, practices, with their material, conversational, interactional, embodied, rational and implicit aspects. This perspective allows to make sense out of the cooperation between humans and implement adequate digital tools.

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SYNOPSIS

Digital tools in advisory services: from a disturbing factor to an effective practice support

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1 Introduction

Advisory services are a specific form of collaboration between two individuals: the advisor and the advisee. During an encounter, the protagonists engage in a complex interaction which involves their institutional identities, asymmetries of knowledge, different interactional rights, and sophisticated objectives. Those various structures are held together by routines and scripts, thus enabling an efficient conduct: advisors and advisees do not need to explicate and negotiate their institutional role or their rights but, instead, enact them intuitively. Introducing a collaborative, IT-based system into this intricate meshwork can cause detrimental effects: IT design, as a product of abstract and rational thinking of the designers, has the tendency of making the implicit structures visible or even emphasizing them. For instance, the institutional identity gets obvious, at latest, when the advisor enters the advisees data under a large caption saying "client" visible to both participants and the interactional rights gets emphasized too as the advisor is the one using the tool. As a consequence, the visible and obvious representation will overthrow very sensitive interpersonal matter: the illusion of being special and individual, an advisor gives to each of her client, will be defeated by the tool showing how "standard" the advisee actually is or the feeling of impact on the situation will disappear if the computer says "No!". Overall, collaborative IT in advisory services explicates, changes or destroys routines and scripts established over centuries on how people collaborate in such encounters. Why should we then burden ourselves with the collaborative IT in advisory services?

Modern technology offers means for an effective and efficient support of previously disregarded, but relevant aspects of advisory services – it can support proper documentation, improve knowledge transfer from the advisor to the advisee and empower the personnel. After the 2008 crisis, the traceability of decisions taken during an investment or a mortgage advice service became critical for the investors and for the governments; prior to that the documentation of the encounters was scarce, thus generating responsibility issues and deception accusation. Using IT for documentation purposes can reduce the workload and, simultaneously, enhance the objective character of protocols. The content of advisory sessions gains in complexity because of larger product ranges that can be recommended, more complicated life situations and easier access to diversified information online; brochures and static material cannot reflect all this complexity accordingly such that advising requires more vivid and flexible material. IT can provide dynamic visualizations and give access to multimedia content for more individualized and informative advice, especially for audience used to the expressivity of modern media like online videos. Finally, being an advisor is not an exclusive occupation

anymore – frontline and back office employees switch between advising and other tasks for more efficient work distribution; as a good outcome, they bring in their domain competence into the encounter, but, on the other side, they often lack formal preparation for being an advisor. Providing them with guidance through an adequate IT system can help them develop advisory competences and increase the standardization across employees from various backgrounds. Potentials of IT go even further: it can spark joy and offer aesthetic experiences to advisees and advisors, it can integrate personal advisory services in the service provision chain including on-line and off-line interactions and, finally, it can be a unique selling proposition for services in highly competitive markets. Accordingly, IT in advisory services can generate additional value and respond to new and persisting issues, thus transforming the advisory services to make them contemporary and to equip them to be in keeping with the times.

This dissertation asks *how digital technology can be deployed to transform advisory services*. It puts two cases in the focus: financial advisory services and burglary prevention advisory services. Financial advisory services, such as investment or mortgage consultations, have commercial character, imply monetary incentives for both sides which may lead to distinct or even opposite objectives, and involve transactional elements. Burglary prevention services in the studied form are provided by the police and are non-commercial encounters, the advisor does not have monetary or material incentives which influence her recommendation, are free of charge and the advisee does not make any formal commitments. Additionally, financial advisory services as studied here happen at the bank and have stationary character, the advisor and the advisee sit at a table, whereas the burglary prevention services involve an exploration of a residential property, such that the advisor and the advisee move from one place to the other throughout the service duration. While those differences have essential impact on issues like the content and the form factor of technology to be designed, throughout this dissertation we identified a range of similarities between those two domains, such as the strong dependency of actions on the proved routines and the rationale behind them or the strong impact of conversational practices. Consequently, despite the obvious differences, this dissertation relies on the assumption that there is a common denominator that characterizes digital transformation of advisory services across domains.

This synopsis summarizes the scientific articles which form the basis of this dissertation and explicates the relationship between them beyond what is made clear in those articles. This shall give the reader an overview before entering the single publications. As they were all published or are currently under review at peer-reviewed and archival outlets within the fields of information systems (IS) and computer-supported cooperative work (CSCW), they needed to reflect the interests and background of those respective communities. The synopsis first points to a set of common problems within advisory encounters, thus elaborating on the research motivation which is implicitly or explicitly shared by all subsequent articles. It then discusses issues occurring upon introduction of early IT into the advisory services, thus summarizing Part One of the current dissertation. Third, it describes the turn to practice this research made after identifying and abstracting problems generated by the earlier IT, thus summarizing Part Two. Afterwards, it presents how to *design for practice* in advisory encounters while illustrating this with two examples: LivePaper developed for financial advisory services and SmartProtector developed for burglary prevention services – this recapitulates Part Three. Finally, the synopsis discusses further implications elaborated in the Closure.

2 Advisory services – issues and potentials

In general terms, technology has transformed service provision across domains and boundaries. And this transformation continues or even takes on speed. Withdrawing money from the bank got stepwise replaced by using ATMs, paying with credit cards, paying with online payment systems using a mobile phone, up to the current move towards cryptocurrencies, which do not have a material counterpart anymore. People transfer money across continents from the screen of their mobile phone, open accounts with a few clicks and take on mortgage or book hotel through an online price comparison machine. This transformation was so successful, that companies and societies even changed the way they think about buying products: service-dominant logic (Vargo and Lusch 2006), a paradigm describing the market, postulates that the product work or availability is what generates value and this is what players exchange within a service-dominant market. The change is driven by the new, technology-based service provision channels (Vargo and Lusch 2006): offering a service got cheap, easy and moves parts of the work to the service recipient. Altogether, the service-oriented businesses flourish due to the technological progress of the last years. However, not all areas are equally and positively affected by this change.

Personal advisory services, that involve a skilled advisor and an advisee, have retained their character for decades. They kept their primary character of a more or less free conversation between a company representative and an individual, who seeks advice on a topic of interest. Formally, those encounters embrace exchange about advisee's needs or requests, discussion of the general offering, and a try to match a solution to the advisee's situation (Jungermann 1999). However, the interaction between the two protagonists involves much more than that: starting from the first minute of greeting each other, they take care of establishing and showing mutual rapport and understanding, they transfer an impression of oneself to the other and manage it, they make sure, the other party follows their thoughts and explanations, they prepare related activities to be conducted after the encounter and they execute many other activities to coordinate, communicate and collaborate. Given the tendency towards efficient and easy services, this form of interaction between an organization and an individual seems expensive. Given the structured and standardized service processes, advisory services seem only loosely embedded within the service landscape. And, given the increasingly interactive and vivid interaction with and through computers, a conversation may seem outdated and inadequate. This puts pressure on the personal advisory services. Without them, organizations that previously had a specific advantage, such as local roots and identity, well-skilled advisors, or reputation, may dissolve in the online "winner-takes-it-all" competence with one-dimensional decision structures. This also puts pressure on the advisors, who fear losing jobs to robo-advisors and self-services (Fein 2015; Sironi 2016). Finally, also the advisees may be negatively affected because they will be forced to follow standardized processes, while sometimes they do not even know what questions to ask, or they will directly or indirectly pay for not fitting to the standard case. Overall, traditional, personal advisory services have survived the digital transformation of services without significant changes or damage. However, with more intelligent machines and with advisees used to self-service, their existence may become a matter of time.

Nevertheless, the growing competition between service provision channels is not the only issue affecting advisory services. Some problems reside deeper and are inherent to

advisory services, and particular to the asymmetries regarding information and interests as claimed by agency theory (Golec 1992). In particular, the advisor and the advisee differ strongly with regard to their knowledge about the domain and about the procedures employed during the service. The information asymmetry goes in both directions: the advisor does not know the exact situation and objectives of the advisee and needs to rely on the provided information, and the advisee does not possess the broad domain knowledge of the advisor (Oehler and Kohlert 2009; Nussbaumer et al. 2012). However, the advisor has more knowledge of the process and better overview of what belongs to an advisory service in what order (Nussbaumer et al. 2012). Furthermore, due to the institutional character of the conversation, the advisor is in the position to distribute interactional rights and air time (Ten Have 1991; Svennevig 2001). Whereas those problems were particularly discussed for financial service encounters (Oehler and Kohlert 2009; Nussbaumer et al. 2012), similar tendencies were reported for doctor-patient encounters as well (Ten Have 1991). The dominating position of the advisor can have severe consequences: the 2008 crisis revealed cases of trickery and deception in banks (Oehler et al. 2010), but also less obvious malpractices are possible: If the advisor wants the service to by quick or feels inconvenient when asking open questions, she may focus on collecting the very essential information only, which may lead to fragmentary advisee profiling and improper recommendation (Oehler et al. 2010). All in all, advisory services format implies several asymmetries between the interlocutors – it is not just an expert meeting a layperson, but two individuals with their personal interests or needs, and two interlocutors fulfilling conversational roles. Dedicated IT has potential to meet those challenges in several ways: It can contribute to a balanced and collaborative atmosphere by providing a common artefact of work and replacing individual tools (Novak et al. 2008). It can support transparency of the process and of the information by adequately visualizing both aspects to the advisee and the advisor (Nussbaumer et al. 2012). And, it can support better and more sustainable domain information transfer (Heinrich et al. 2014b) or profiling activities (Kilic et al. 2017) by guiding the interlocutors in an explicit or implicit way.

Another problem poses the missing or inadequate service documentation. This, again, results from the advisory service character: whereas advisor normally focuses on the advisee, the advisee concentrates on understanding the information he receives. Their capacities to take notes or prepare a protocol about the encounter are, therefore, limited. However, for the sake of the decision traceability and securing the advisee's rights, regulators or organizations obligate the advisors to create reports in different forms (Kilic et al. 2016). This requirement unites mortgage advice services, insurance services, doctor-patient encounters, as well as burglary prevention officers. Reporting either generates a pre- and post-processing overhead or leads to poor interaction during the encounter (Oehler et al. 2010; Pearce et al. 2012). Especially in advisory services, which require moving around, like in burglary prevention services, composing documentation of the encounter generates additional challenges: the advisor needs to learn and interact with the physical context, adapt to specific circumstances, and sustain the conversation with the advisee – creating a meaningful and individualized report during the encounter is not always possible. However, post-processing also generates problems: in mobile encounters the necessary information is linked to the particular objects and places distributed, for instance, around the house; consequently, the advisor risks of forgetting or "losing" information if she does not take notes along the way. Documentation is the most straightforward task a dedicated system can support during an advisory service, for

instance, by storing all provided or collaboratively produced information. However, systems developed for the purpose of documentation only, without considering the interpersonal character of the advisory service, tend to implement simplistic processes and lead to poor interaction anyway (Pearce et al. 2008, 2012). Overall, advisory services lack adequate documentation support, even though internal or open reports could bring benefits for all stakeholders, including the advisee, the advisor, the organization, and the service sponsor.

Being an advisor is mostly complemented with other responsibilities and activities, which occur without the presence of the advisee. For instance, even though a typical patient encounters a physician during an examination, physician's job is not limited to it. The same holds for burglary prevention services, financial advisory services, and teacher-student encounter. While some advisors receive specific training on advising (e.g., selected financial advisors at banks), many of them learn on the job and by observing more experienced colleagues. In doing so, they do not only inherit domain competence, but also specific behaviors and a specific understanding of the mission statement. However, they also risk repeating mistakes and misinterpretations. The organizations as well as advisors themselves may fail at identifying and eliminating ineffective or inefficient behaviors, because they encounter the advisee, mostly, alone or with their trainee and receive little feedback on the quality of their services (Giesbrecht et al. 2016a). Additionally, the behaviors appropriated years ago may get less effective over years: While a few years ago an advisor encountered an advisee, who informed himself about the matter among friends and family members, today's advisees often enter the encounter with an extensive knowledge and preconception obtained online. In particular, physicians get frequently confronted with "doctor Google"– a situation, their senior colleagues did not know – and need to establish new behaviors and strategies to deal with that situation (Swindell et al. 2010). Overall, digital tools may help improve the advisory service quality with subtle process and information guidance, without generating the atmosphere of control and assessment. Additionally, it can be equipped with abilities adequate for the new circumstances, thus empowering the advisors and improving their skills on the job.

Generally speaking, advisory services are under pressure. They have survived the high-speed transformation in service provision, but there are increasing risks, that they disappear in favor of robo-advisors and self-services. Digital tools promise improvements and solution of advisory services' essential problems. Thanks to digitalization, advisory services can be better integrated into service provision landscape and can provide better experience to the advisee. Dedicated systems have potential to empower the advisor, reduce asymmetries between her and the advisee, simplify documentation and create a collaborative atmosphere. Such transformation would generate value to all involved stakeholders. If there are so many advantages, why do advisory service encounters remain largely analogue or use a computer as a documentation tool visible only to the advisor?

3 Essays on the double-edged effects of digital tools on advisory practices

The first part of this dissertation, entitled "Double-edged effects of digital tools on advisory practices", explores the reasons for the non-presence of the digital technology in advisory services. Previous literature approaches this question with questionnaires and

interviews with advisees, advisors or their managers (Mogicato et al. 2009; Schwabe and Nussbaumer 2009) and shows that the stakeholders have fears of a dehumanized encounter and loss of control. However, articles in Part One extend on that while taking a different approach. They analyze the interaction between the interlocutors in experimental setting and try to employ this perspective to understand why the systems did not find their way into practice: what caused the experiment participants to argue, at least partially, against the usage of those systems outside the lab. In other words, the articles explore whether and to what extent the fears reported in earlier studies can be confirmed through qualitative and quantitative observation of the actual interaction. While each article has its own specific contributions, in the context of the dissertation, they contribute the understanding of what prevents the digital transformation in advisory services.

The first and the second article use the same data basis to explore and interpret ineffective occurrence patterns of pauses in IT-supported financial advisory services. The first article, "More interactivity with IT support in advisory service encounters?", was published at the conference "Mensch und Computer". It introduces and provides argumentation for the employed methodology and interprets the results in the context of *joint problem solving* – a concept from the advisory service research. The second article, "Tuning in to More Interactivity – Learning from IT Support for Advisory Service Encounters", extends the interpretation context and proposes the application of *interactive problem solving* from negotiation practice to advisory services. Both studies analyse recordings of experimental advisory services conducted with a dedicated advisory service system deployed on a 30'-touch table and a 10'-tablet, as well as without any IT at all. The systems used in the experiments were 2nd and 3rd generation of support systems developed at the Information Management Research Group (IMRG) for the financial advisory services. The results point to specific patterns describing the occurrence of unfilled pauses throughout the advisory encounter: in all settings, the unfilled pauses occur more frequently at the beginning rather than later in the encounter. The frequent silence and interruptions signalize a phase of hesitation, where the interlocutors adapt to each other and to the situation: they *tune in*. The tuning-in phase exhibits higher amounts of unfilled pauses in IT-supported setting – the interlocutors spend approx. 4% of time silent and without engaging in any specific action compared to 2% in the non-IT setting. However, using the system pays off later during the encounter: it supports a more reciprocal and balanced out interaction between the advisor and the advisee, which suggests an interactive exchange rather than a monologue from the advisor: in the non-IT condition the advisor speaks up to 90% of time, while it is only approx. 75% in the IT conditions. The advisee uses the additional air time to contribute towards the solution identification. Whereas the conference article concentrates on the joined nature of effort that the interlocutors make during the encounter, the journal article extends it to the notion of *interactive problem solving* as the desired form of collaboration during advisory services. Overall, the first and the second paper frame IT as a double-edged sword for the interpersonal interaction in advisory services: while it generates problems in the early phases of the interaction, it can contribute to a more interactive encounter later on. As a consequence, the design of a digital tool for advisory services should take care of how the IT gets introduced into the encounter.

The third article "How IT-artifacts disturb advice giving – Insights from analyzing implicit communication" analyzes financial service encounters supported with two different dedicated support systems deployed a 27'-touchscreen computer positioned on

the table between the interlocutors. The systems were developed together with a major Swiss bank and formed already the 4th and 5th generation of IMRG support systems for financial encounters. The study focuses on conversational analysis of episodes showing particularly ineffective communicative behaviors involving silence, unexpected breaks and very slow speech production. It sheds light on pauses and interruptions analyzed quantitatively in the previous two articles and reveals patterns that produce inefficient communication: advisees who get stopped by the advisor when talking while she interacts with the system, advisees who slow down or stop talking whenever the advisor touches the system, as well as advisors who get confused when they interact with the system and the advisee does not slow down or stop. Nothing similar occurred in the conventional service encounters: the advisees do not talk slower, stop or get interrupted, when the advisor takes notes or make calculations. Obviously, some advisees assume that operating the system may take too much attention from the advisor and adjust their pace accordingly, while others, who do not adapt their behavior by themselves, receive more or less explicit requests from the advisor to do so. The paper concludes with the interpretation that the conversational feedback mechanism, otherwise used by the advisor to acknowledge reception of a message from the advisee by, e.g., nodding, gets distorted by the simultaneous interaction with the system. As a consequence, an advisory service system shall facilitate only minimal and most natural data input (e.g., through handwriting) whenever the advisee makes an extended verbal contribution, such that the advisor can provide the usual conversational feedback and give the advisee the feeling of being an active listener.

Overall, the first part of the dissertation makes clear how much a digital tool changes the interpersonal matter in an advisory service: the impact is visible in global terms as well as in particular incidents. The IT systems presented in this part have various sizes, forms and designs, but all generate essential changes to the way the interaction between the advisor and the advisee unfolds. The third paper explicates how the particular advisee and advisor behaviors, including statements, pace, and content, adapt to the new situation. While the presented studies do not confirm that the interaction necessarily gets worse and that IT should be feared, they confirm modification of interpersonal conduct which can seem artificial given the advisors' adherence to specific behaviors. To better understand this conversion from the perspective of the advisors, it becomes central to explore their behaviors and why transforming them causes so much uncertainty and communication problems.

4 Understanding advisory practices

The Part Two of this dissertation embraces articles, which took the practice perspective to understand what actually happens in advisory encounters. Previous research often took the path of validating or interpreting process models (Jungermann 1999; Oehler and Kohlert 2009) – be it through classification of behaviors, interviews or suggestion that fits those models. Other studies took a different approach – they tried to establish new behaviors through training and through digital tools (Giesbrecht et al. 2014; Schmidt-Rauch and Schwabe 2014; Heinrich et al. 2014b). Finally, many studies approached particular behaviors and aspects of advisory services to improve them with IT (Novak and Schmidt 2009; Nussbaumer et al. 2012; Kilic et al. 2015). A deep and global understanding of the practices advisors engage in was missing: *what do they do, why do they do it* and *why do they do it the way they do*? Answering those questions seem essential

to develop adequate IT, but the answers were scarce and often relied on formal models of advisory services or views of managers and advisors rather than the analysis of the actual practice. The articles in this dissertation part use a definition of practice that combines three elements: routinized and pattern-like character of practice typical for conversation-analytical tradition (Schegloff 1986), relation to social, organizational, public, and private discourses which form the milieu of practices (Scollon 2001), and dependence on material, physical, object-oriented and embodied context of action (Schmidt 2011; Wulf et al. 2011; Shove et al. 2012). Humans directly and routinely engage in practices but do not attend to them in an analytical, conscious manner. Advisory practices are such routinized behaviors typical for advisory services – the protagonists in those practices are advisors, who have the chance to establish routines in this realm. The advisees enact, normally, conversational practices they know from other, unrelated contexts. In the context of this dissertation, the study of advisory practices was launched to better understand why digital tools, which were developed along the proven advisory process models and suggestions from literature, generate problems like the ones reported in Part One.

The fourth article in this dissertation describes "Paper practices in institutional talk: how financial advisors impress their clients". It analyzes mortgage advice services in a Swiss regional bank serving an area of approx. 600 000 inhabitants based on notes and interview material from field work in several branches of the bank and video recordings of experimental conventional advisory services conducted by the advisors. The article arrives at the conclusion that a rationale behind many advisory practices is impression management: the advisors established routines which show how neat and tidy they work or how professional they are. This gets explicit in many practices involving paper: The advisors prepare their folder before the advisory session to enable for a smooth process. They hide some notes from the client, while presenting others directly to him. They order their documents on the table to access particular sheets of paper easily. They position sheets of paper across the table to explicate the choice the client has. This choreography of materials reflects participants' institutional identities and makes, for instance, the advisor's control of interaction resources and domination quite explicit. The study reveals that the sheets of paper used in advisory encounters are not simply a medium for information storage and presentation, that could be easily replaced by anything else, like a digital screen. The pieces of paper have their own meaning (depending on content, placement, and use in practice), they represent the institution (for instance, official documents with bank's logo), and they are used to structure the interaction (moving a sheet of paper often initiates an activity shift and impacts interlocutor's focus). The article makes clear that the role of paper in mortgage advice services was regularly underestimated in previous research and in previous designs: replacing paper with a touchscreen took one of the central tools away from the advisor.

The next article analyzes interaction in the other area central for this dissertation: burglary prevention services offered by the police. The data concerning burglary prevention encounters results from a line of projects between IMRG and four police departments launched to develop a tool to support police advisors at conducting their services; the tool, SmartProtector went through multiple levels of maturity and was evaluated along the way in experimental and in field testing. In conventional advisory services and in sessions supported with an early prototype, collected in an experiment, the article "Persuasive practices: learning from home security advisory services" identifies a range of behaviors oriented at convincing the advisee to take specific action or change their attitude. For instance, many advisors carry around specimen of

mechanical parts such as locks, which they employ not only to show how a mechanism works, but they position it also at the window or door and encourage the advisee to imagine that it would be installed in a specific place. The article frames those behaviors as *persuasive practices*, a specific set of advisory practices. The paper was the first one to introduce this concept and describe persuasion not as cognitive or intentional model, but as routinized behaviors, thus extending the description of persuasion dominating in the area of persuasive technology. The study analyzes the occurrence of those practices and links them with advisees' assessment on the persuasive character of the encounter. In particular, it confirms that the aesthetics of materials used during the advisory service correlates with the persuasiveness of the encounter – this holds for conventional and IT-supported advisory services. Furthermore, it reveals that many elements and functions of the SmartProtector were appropriated in a way that supports persuasion (e.g., when showing a video of burglar entering a house, advisors spontaneously contributed comments and statements emphasizing the risk). This makes clear, that at least some practices of the advisors are oriented at persuasion even though they may be reluctant to admit it openly. The article points to the fact, that not a technology or material is persuasive in itself but the way it gets appropriated allows for persuasion enhancement. We claim, that persuasive elements of the technology could only be appropriated in a way that enhances persuasion, because the conventional advisory services already involved more or less explicit persuasive efforts.

The sixth article in this dissertation builds upon the notion of persuasive service encounters while discussing involvement, a central aspect of longitudinal success of persuasion. It is entitled "Involvement Practices in Persuasive Service Encounters: The Case of Home Security Advice". While taking a portion of the same data basis as the previous paper and extending it with observations conducted in the field, the paper uses conversation analysis of several episodes to study the behaviors employed by the advisors to enhance advisee's engagement in the ongoing conversation. The study reveals that advisors sense how much the advisee follows the interaction and try to maintain this involvement with material and physical action: among others, they refer to or interact with objects around them, they use or re-use their specimen, they gesticulate and visualize. Additionally, they spark emotions with stories or targeted questions. The article makes clear that a window at advisee's home is not just an element to be assessed, repaired or improved in order to prevent burglary, but it is an advisor's tool during the encounter. Similarly, a story does not only transfer a hypothetical course of action but plays a central role for the advisor to engage with the advisee. Providing the burglary prevention advisors with a tool that hinders them at interacting with their physical and material context or which makes it difficult to include a seemingly simple story may cause essential problems during the interaction. The advisee may easily loose interest and the advisor may be left with limited means to repair his involvement. While IT offers specific ways for involvement maintenance, like vivid videos or illustrations, presenting them too often during a service may nullify their engaging character. Therefore, digital tools should consider how take advantage of the physical circumstances and the existing practices, rather than replacing them, as this may lead to extinction of several various and important behaviors in favor of a single one intended in the design.

The second part of this dissertation offers an insight into both studied domains while focusing on the practices advisors employ in conventional services. It suggests that the risk of disturbing advisory services with digital tools rises when the tool ignores the existing practices (e.g., subtle and latent persuasion rather than explicit one), the rationale

behind those practices (e.g., impression management), as well as the material context thereof (e.g., involvement maintenance through physical action). A look from this perspective at the problems reported in the first part, allows for reserved critics of the earlier systems. The advisors' means for impression management in those scenarios were reduced to using the tool. Showing that one works in an orderly manner, was possible only through action and could not be made visible or represented in a physical manner. Since the design of the tool was predefined, the advisors could not relate to that or express themselves through it. The content of the tool – visible to both parties – did not afford unrelated and engaging excurses, but rather enhanced focus on the hard matter. In particular the prototype in the third article ignored the fact that collecting information by the advisor had a subtle and unobtrusive character (taking notes on a block), and made this action outstandingly explicit, such that advisees felt obligated to wait or were stopped by the advisor till the action goes to an end. By neglecting the material nature of action, overemphasizing some behaviors, and ignoring the implicit rationales, the system generated confusion and unpleasant interaction. In consequence, building IT for advisory services is not about following abstract processes, visions of the management or even the advisors' own ideals of how advisory services should be like. The design should reflect rationale, context and actions summing up to existing practices and work with those ones. Just to provide an example, if the digital tool aims at transforming services to make them more emotional, the tool should take on the typical emotions-related routines and contents of conventional services and extend, emphasize or expand them to make the emotional message stronger rather. This is why videos in burglary prevention worked quite well: the story of the burglar entering a house, a typical narrative, burglary prevention advisors use during the encounter, received a new, visual element which was not there to replace anything. Overall, transforming advisory services requires time, deep insight and endurance to uncover what is hidden behind the simplistic process models and surface behaviors, and then approach it accordingly with digital tools.

5 Transforming advisory practices with IT

The third part of this dissertation studies the design and impact of two systems developed along the above insights for application in advisory services. As suggested by earlier results, the development and design activities were adapted to consider advisory practices from the perspective of the rationale behind them, as well as the material conduct and their routinized character. Nevertheless, the design processes considered the practice perspective at different maturity levels of the prototypes. The system for financial advisory services, LivePaper, was from the early stage oriented at understanding of what advisors do with paper (and later, with other materials) in the advisory services and why – the project team used those insights in their design ideas. The system for burglary prevention advisory services was originally inspired by a process model of burglary prevention services elicited in the field and combined with the results of previous research. Only with time, the project team understood the role of persuasion in those encounters, and even later the role of persuasive practices or their multimodal nature as described above. Consequently, the advisory practice perspective impacted formally the final development and the roll-out phase. However, the practice view was implicitly present already before this turn – the project team benefitted largely from extended input from two policemen and their longtime experience in burglary prevention domain. As participants and key users in the pilot study, they provided regular feedback on which

design ideas work and what does not work. Even though this information was neither formally codified nor systematically analyzed and did not always undergo a formal scientific reflection, it was considered in the development process. The actual reflection on the nature of persuasive practices happened, in this case, not prior to the development but started later and explained why specific ideas work better or worse in practice and was able to identify specific best practices. Consequently, the practices perspective informed the training and on-boarding process for new users more than the design of the tool itself. Formally, the system for financial advisory services, LivePaper, was developed in a common research effort between the IMRG and the Fachhochschule Nordwestschweiz for application in the local Swiss bank mentioned earlier. Fachhochschule Nordwestschweiz conducted most of the technical development in the system, while IMRG (Dr. Mehmet Kilic and the author of this dissertation) contributed conceptually and evaluated the system. The final version of the system for burglary prevention advisory services, SmartProtector, was developed by the IMRG, where the major development effort was with Dr. Tino Comes. Conceptual input came from Dr. Tobias Giesbrecht in the early development phase and from the author of this thesis in the later part of the development and during training. The user feedback came from police officers from the Stadtpolizei Zürich throughout the duration of the project, as well as Kantonspolizei Zürich and two police departments in Germany towards the end of the design and development effort. Despite the differences concerning the genesis of the systems, the third part of this dissertation confirms the value of practice perspective for successful digital transformation in advisory services.

The seventh article entitled "Don't be afraid! Persuasive Practices in the Wild" reports on a study conducted upon the roll-out of the SmartProtector's final version to 18 advisors from Switzerland and two German states. Nine randomly selected advisors were observed when conducting IT-supported advisory services at, overall, 24 various properties. The study systematizes the persuasive practices advisors employ in the services with and without SmartProtector. The paper reveals four major organizational and social tensions that governed the appropriation patterns and the observed practices. For instance, the fact whether the advisors engaged in showing an emotional video or helped the advisee prioritize the issues was, to a certain extent, governed by their mission statement understanding: Some advisors consider themselves more in the role to provide independent and possibly objective information, while others tend towards recommending doable solutions and motivating advisee to implement them. Whereas the tendencies have always been there, they became explicit after confrontation in several weeks or months of daily work with the SmartProtector. The tensions occurred at the level of practices rationale (meaning the rationale behind the specific advisor's practice) and behaviors as well as the rationales that got implemented in the SmartProtector in an explicit or implicit manner. Advisors who followed rationales similar to those implied in SmartProtector did not experience strong tensions and reported on successful enhancement of their practices through the usage of the tool. However, those advisors, whose rationale turned out to be different (sometimes after numerous services with the tool), expressed much critics, tended to ignore tool's affordances and did not experience much improvement. Those differences were not predictable based on the advisors' statements: all claimed to possess similar knowledge or employ similar range of methods. This points to the fact that studying various practices along with the rationales behind them and understanding the differences rather than emphasizing similarities may contribute to a successful transformation in advisory services.

The article "A journey of discovery and transformation: Persuasive systems for advisory encounters" offers a zoom-out perspective on the whole project conducted in the area of burglary prevention: from the early ideas about potential problems in burglary prevention advisory services up to the final pilot project evaluation that happened after the observation of practices described in the seventh paper. In the context of this dissertation, this study makes clear that designing for practices in collaborative realm is a challenging task that requires years of endurance and openness. It illustrates that researchers need to remain critical about how they frame and conceptualize a situation. In the very beginning, the burglary prevention advisory services were seen analogous to services in banks or in town halls, but the subsequent research provided more adequate perspective involving persuasion, persuasive technology, and persuasive practices. The article contributes a holistic description of a persuasive system for face-to-face persuasion and describes the design-as-a-search process that was needed for the transformation of that service. Additionally, it conceptualizes the link between rationales of practices, behaviors and the appropriation of a system: it re-defines the CSCW and IS mantra calling to *design for practices*, while emphasizing the role of the practice rationale. All in all, the eighth article of this dissertation makes contributions towards the system design, design science research, and the concept of practice.

The ninth research article included in this dissertation, entitled "High-touch, high-quality service interaction: Human-centered financial advisory services with tangible pen & paper interfaces", describes the design and effect of LivePaper from the user's perspective. It derives design principles implemented in the system from the human-computer interaction discourses around mixed reality and from the previous research on advisory encounters. It also points to the role of previously described paper practices for the design of the system and illustrates how they impacted the system development. The study's data includes experimental evaluation results that document the outstandingly positive impact of LivePaper on the pragmatic quality of the encounter as well as on the high-touch, interpersonal matter. It attributes the consistently positive effects to the special concern given to the material nature of practices that acknowledges not only the use of paper, but also the physical arrangement of the advisory situation and the availability of an extended arsenal of material elements for enhancing hedonic qualities or making abstract changes easy to experience and comprehend. In the context of the dissertation, the paper provides the evidence that designing for practices goes beyond designing for behaviors and should consider the rationales and material configuration of practices too to generate potential for effective transformation.

Overall, the final part of this dissertation makes analytical and design contributions. It provides empirical evidence for the complex nature of advisory practices and illustrates how to address this issue during the design of digital tools. It also makes clear that digital transformation of advisory services may involve longitudinal efforts and requires a holistic approach: advisory services are not detached sandbox episodes, but interact with social and organizational discourses (like the role of a police officer as an independent and objective person), material and physical context (door or window as tools and not only an assessment object), or scripts and conversational roles (domination through access to tools). Therefore, the transformation effectiveness of digital tools is not given – an alignment between the intended practices, rationales behind the practices and appropriation support (like training) is required to produce a sustainable effect on the practice. The systems presented in the last part of the dissertation bridged the gap between research and practice: SmartProtector was turned into a commercial product by

an external company and is in daily use by Swiss burglary prevention advisors in many regions of the country. LivePaper enters the pilot phase and was rolled out to two branches to be used by eight advisors over the next months. The author of this dissertation stays in the loop to learn about further effects of the transformation launched with those two projects.

6 Advisory practices as an asset

The synopsis makes clear that transforming advisory services cannot work without addressing practices in the design of digital tools. IT systems developed along abstract process models and management intentions disturb the fragile interpersonal interaction by making things and actions obvious, which would otherwise remain a silent element of an advisory service. Apparently, the systems described in articles one and two generated hesitations within the first part of the encounter thus generating a more extensive and intensive tuning in, as if the tuning in happened not only in between the interlocutors but also between them and the tool. The systems described in the third article put much emphasis on the data input activities, which was just note taking in the conventional setting. Consequently, the data input governed the interaction between the interlocutors. The feeling of being a special advisee, the high-touch nature of the encounter, the efforts related to rapport building, or the small talk get dominated by the documenting, typing in and moving icons around on a large screen: large gestures for small and, at that moment, non-essential tasks. However, IT also has the potential to improve advisory encounters as illustrated in the third part. A narrative about the burglar entering the house can get complemented by a video or an explanation of the difficult Swiss mortgage system can get emphasized with a novel tangible interaction with the system: visible gestures for essential activities. Whereas the digital transformation failed in the earlier cases, it was quite successful in the later cases – when the design approached the essentials in the first line. However, how to differentiate essential from non-essential activities? Why is note taking and documentation less essential than telling a short and fictional story of a burglar?

Finding an ultimate answer to those questions may seem like a philosophical goal. From the longitudinal perspective, creating a proper documentation seems more important for the advisee and for the advisor than telling a simplistic story. However, the participants liked putting emphasis on the story via multimedia in the burglary prevention and disliked or were ambivalent towards collaborative documenting emphasized in an early tool for financial advisory services. We argue that the prevalent characteristic of advisory services lies in their conversational and experiential character – people value them because they are personal encounters, ones that have potential to become interesting exchanges with an individual, and potentially leads to a transaction or knowledge transfer. However, only seldom an advisee considers advisory services in terms of work and advisors also count meeting advisees towards the positive side of their job. This points to a dilemma concerning the design of technologies for collaborative encounters: if the interpersonal matter plays the primary role, should digital tools concentrate on those interpersonal aspects or should they rather move the emphasis towards work? The solutions from Part Three followed a trade-off tactics. LivePaper's design was oriented at attractiveness and interaction between the interlocutors, but it seamlessly integrates and affords work-related activities in this context. SmartProtector can be used as a shared or individual tool by the advisor, however, most advisors share

the screen with the advisee just for showing multimedia content or creating graphics and complete more mundane tasks (like denominating the security issues) individually. Overall, those systems qualities which are in line with the advisor's rationales for practices are put forward and other aspects of the system are held back if possible. Looking at the rationales that explain advisory practices helps separating the essential from less essential behaviors. And, in the studied cases, no advisor declared documentation as the main rationale.

Nevertheless, IT has also potential to support those secondary tasks. For instance, documentation can emerge from various activities of the advisor with the system – the SmartProtector generates documentation based on the pictures taken by the advisor to explain specific weak issues and solutions from the data base marked during the encounter. LivePaper turns explanation of complex mathematics behind mortgage into trying out and talking about several scenarios which can be manipulated with a single tangible element. Consequently, the great challenge when designing for advisory practices is to hide those work aspects where computers excel, such as systematizing documentation or calculating scenarios and to emphasize and complement aspects in which humans excel, including unconstrained conversation, impression management, and persuasion. To that extent, advisory practices pose a singular asset of personal advisory services which is hard to substitute with self-services or robo-advisors. Advisory services offer the optimal domain where powers of computers and powers of humans can be combined to offer a high-quality and high-touch experience.

However, potential of digital tools in advisory services goes beyond improving a pleasurable and interpersonal experience. LivePaper generates pragmatic quality beyond the level of conventional service encounter thanks to the visualizations, clearer structures and expressive activity shifts involving use of tangibles, which all contribute to transparency and clarity. The SmartProtector offers means for shared drawing and other collaborative activities as well. The bottom line is, that the systems introduce a structure and guide the advisor accordingly, thus contributing towards standardization. They also empower the advisors: For instance, LivePaper offers means for simulation of several scenarios at once, which would involve long minutes of calculations in conventional advisory services; the SmartProtector provides access to a databank of security products along with illustrations and explanatory videos otherwise unavailable outside the office, such that the advisors can offer a more individualized and fitted recommendation to the advisees. All in all, transforming advisory services with digital tools is only possible, if the tools can be easily and seamlessly appropriated, which requires deep understanding of the practices. However, when those tools get accepted based on their effective support for the essential aspects, they can afford further actions, which then generate an added value to the advisors and to the advisees.

The synopsis summarizes the central standpoints developed throughout the dissertation, which required several years of individual effort and group work, as well as discussions and mutual inspiration within and beyond the research group. Each of the papers included in this dissertation forms a separate whole, written often much earlier than the current synopsis. Consequently, some concepts are now clearer than when the manuscripts were composed. Additionally, the intended audience and by the review processes impacted each of the articles as well. The above text highlights the overlaps between the single articles and integrates them into a coherent research output with the following central messages:

1. Digital transformation in advisory services needs to address and support existing advisory practices to be successful and sustainable.
2. Advisory practices are complex – they involve an implicit rationale, rely on the material and physical context, and have routinized interactional character.
3. Designing for practices means designing for rationales behind the practices while considering the physical, material and conversational circumstances.
Nevertheless, each particular article provides conceptual and design contributions on its own, which could not be considered in a short summary. A reader will uncover many intermediate steps that flow into a conceptualization of advisory services as a complex choreography of practices and routines rather than a process-driven and programmable performance.

Part One:

Double-edged effects of digital tools on advisory practices

PAPER I

More interactivity with IT support in advisory service encounters?

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Abstract
Advisory service encounters change their character from information provision to joined problem solving, thus increasingly relying on the interactive exchange between the advisor and the advisee. Simultaneously, modern collaborative IT finds its way into service encounters as a method to engineer, enrich, and standardize them. An IT system equipped with interactive features may enhance the encounter's interactivity, but it may also limit it by capturing participants' attention. This study explores the influence of IT on the interactivity in advisory service encounters. It arrives at the conclusion that an extensive tuning in precedes a phase of enhanced interactivity in IT-supported advisory service encounters.

1 Introduction

Service encounters are important type of collaboration; they include patient-doctor or student-teacher consultations, as well as other form of collaborations where an expert, i.e., advisor, provides advice on a particular matter and appropriate course of action to a layperson, i.e., advisee. In the era of instant information access, the role of advisory services has improved: whereas standard cases can be solved by the concerned persons based on the publicly available information, providing appropriate solutions in more complex and wicked situations requires expert knowledge and skills offered in form of advisory services. Consequently, the framing of advisory service encounters has changed from *information provision* by an expert to *joined problem solving* (Schwabe et al. 2016). As a consequence of this re-framing novel support tools and novel quality measures are necessary to enhance and assess advisory encounters.

In particular, as suggested by the name, *joined* problem solving requires both parties – the advisor and the advisee – to *join* the common effort of understanding the situation under consideration and elaborating a solution. In the face-to-face service encounters, joining in means, primarily, engaging in the communication, understood as conveying of the intended meaning and information. Only if both partners establish a two-directional communication, they can proceed with solving the problem – the concept of *interactivity* captures the level to which a two-way communication is present in an encounter (Rada 1995; Torres 1995).

The evolution of service encounters towards joined problem solving as well as the digitization of services result in introduction of modern and dedicated collaborative IT systems to enhance and enrich the collaboration. On the one hand, IT equipped with interactive features and being an interactive medium can be expected to improve the interactivity of the whole encounter. On the other hand, IT may capture so many collaborative resources (time, attention, etc.) from the human participants, that the two-way exchange between them will stagnate, thus reducing the encounter's interactivity. To our best knowledge, an exploration of the role IT plays for the interactivity of modern problem-solving-oriented service encounters is missing. IT more and more finds its way into real service encounters in form of tablet-based mobile apps or other systems, e.g., at financial institutions, doctor's offices, and insurance companies. Consequently, we argue for the necessity of exploring the following research question: *Does IT support enhance or lessen the interactivity of service encounters?*

The answer to this question shall provide effective guidance on the design of modern IT for advisory services thus helping designers and practitioners in the field. We define *IT support* not only as a technological phenomenon but as technology along with the practices it enables and affords. Consequently, linking IT with the concepts and practices related to joined problem solving, service encounter, and interactivity provides a new lens applicable in similar collaborative scenarios. We apply, present, and argue for a particular operationalization of interactivity which can be propagated in other research. We set our scope to financial service encounters, e.g., encounters that clients attend if they want to make a significant investment. This type of encounters shares a lot with other advisory services such as patient-doctor or supervisor-student encounters: First, in investment advisory service, there is much at stake including people's wealth. Second, mutual trust plays an important role in establishing a long-lasting relationship between the advisee and the advisor. Third, the interpersonal (high-touch) character of the session is shown to

be more important for the advisor and the advisee (Mogicato et al., 2009; Schwabe and Nussbaumer, 2009) than the technical and pragmatic issues (low-tech).

2 Related Work

2.1 Challenges and Opportunities of IT in service encounters

Reframing advisory encounters from information provision into joined problem solving bears consequences for the design of simple brochures as well as IT systems. In fact, modern IT is predestined for supporting collaborative service encounters framed as joined problem solving. Traditionally, service encounters were built around the notion of the advisor, an expert who brings all the knowledge and advises an advisee, (i.e. a layperson, a client), what they should do (buy, book, sign) in the given situation. While the problem-solving-based definition keeps the role of the advisor and the advisee, each of them is seen as expert in their own domain: the advisee is the expert in the problem domain – he knows the situation and its limitation best; the advisor is the expert in the solution domain – he knows the range of available solutions and their flexibility. Their encounter deals as space for joined problem solving – each of them brings in their information and they work together towards an optimal solution.

Whereas the traditional definition was built around the concept of a recommendation – an opinion that the expert is producing upon the request from the advisee, the novel definition relies on the concept of a problem and a solution. The problem means the difference between the current state and the desired state, and the solution describes the way between those two states. In joined problem solving the current and desired states need to be agreed upon to enable for a proper search of the solution (Schwabe et al. 2016). In the traditional service encounter IT was built to support the advisor at providing most appropriate recommendation. They were designed to be viewed only by the advisor and reduced the amount of time spend on calculations or bookings; the advisor could turn the screen towards the advisee if they wanted to share it with the advisee (Arvola 2004). Nowadays, IT focuses on supporting collaboration, i.e., joined problem solving. The solutions break with this tradition and introduce effective help relying on such predicates as: (1) shared screen, (2) joined information spaces, (3) flexible and light-weight, non-rigid processes, (4) transfer of skills and understanding based on experience rather than information (Heinrich et al. 2014b; Schwabe et al. 2016; Dolata et al. 2016).

IT developed along those lines was shown to improve knowledge transfer, transparency, empowerment of the advisors and advisees, as well as their motivation to tackle the addressed issues (Nussbaumer et al. 2012; Heinrich et al. 2014b; Schwabe et al. 2016; Dolata et al. 2016). IT has also potential for better documentation of the process as well as its outcomes, for better visualizations, and for streamlining and standardizing the experience across encounters. Nevertheless, studies repeatedly report on the problems regarding the quality of communication and related fears of the involved persons (Schwabe and Nussbaumer 2009; Kilic et al. 2016). Depending on its features and how it is used, IT may destroy or enrich entrance sequences in advisory encounters (Pearce et al. 2008). This reflects the basic dilemma of *collaboration engineering*, which relies on IT-based interventions to establish re-applicable collaboration patterns (Briggs et al. 2013): IT has many advantages in terms of process and product support, and can enforce specific quality criteria and practices, but bears great challenges if it comes to the quality of communication between people. Understanding the role of IT for the communication

quality in collaborative situation is necessary and will remain an ever-open topic. With this study, we want to add a piece of knowledge that may help closing this gap.

2.2 Interactivity

In any *joined problem-solving* encounter, interactivity is a core prerequisite for a successful collaboration. While *interaction* designates the action in which two or more objects have effect on each other, *interactivity* describes the quality and intensity of this action (McMillan 2000). Interactivity has been a widely discussed topic and plays a central role in such areas as communication science, computer science, marketing and advertising just to mention a few (Johnson et al. 2006). There exist countless definitions of interactivity and all add a new perspective to this complex phenomenon (McMillan 2005): (1) Some researchers focus on interactive features of media (Markus 1987) or even single interfaces (Albert et al., 2004) and use interactivity as classification criterion for artifacts. (2) Others define interactivity as experiential measure, i.e., they define the interactivity of an experience through the self-reports of participants or users (Burgoon et al. 1999). (3) Finally, there exist a range of definitions that derive interactivity from more or less observable qualities of the actual interaction. In this category fall definitions using (3a) the *message-based view*, in which the interdependence between consecutive messages is considered as relevant (Rafaeli and Ariel, 2007), and (3b) the *dialogue-based view* that emphasize the conversational nature of interactions (McMillan 2000; Johnson et al. 2006). According to the latter view, an interactive encounter (3b-I) exhibits reduced time lags between the exchanges of the participants or objects (Bretz 1983) and (3b-II) makes the role of sender and recipient of a message easily interchangeable (Rice 1984). In other words, both participants of the exchange often take floor without additional lags.

This study follows the dialogue-based view on interactivity and uses a particular definition proposed by Johnson et al. (2006) for several reasons: (1) we observe real, face-to-face communication framed as dialogue, (2) this view and the according definition attract more and more attention in the recent years, especially in the area service science, to approach the topic of novel service encounters, (3) the definition was designed to bridge the gap between technology- and human-oriented concepts of interactivity. Johnson et al. (2006) see the general interactivity as derivative from the non-mediated (behavioral) interaction and mediated (technology-based) interaction, which both result in an experience of interactivity. Johnson et al. account for *reciprocity*, *responsiveness* (being a specific form of reciprocity), *nonverbal behavior*, and *speed of response* as dimensions that define interactivity in all interactions.

Reciprocity is widely acknowledged in the interactivity literature and is put on a par with "dialogue", "participate", "iterative", "two-way communication", "actions and reactions", and "talking back" (cf. Johnson et al. 2006, for further references). In a reciprocal exchange, participants engage in a more balanced communication where they alternately play the role of sender and receiver, as opposite to a monologue with a single dominating part. If messages in an exchange build content wise upon each other, we talk about responsiveness. *Speed of response* refers to the extent to which messages in an exchange occur in real time or with delay. A minimum delay contributes to the continuity of the exchange, but delayed responses, signalized by breaks and pauses, hinder communication flows, lead to information losses, and reduce the overall interactivity of the exchange (Johnson et al. 2006). Also the definitions mentioned earlier (3b-I and II) stress the role of reciprocity and speed of response, as central and most settled ones within the dialogue-based conceptualization of interactivity.

Importantly, establishing a smooth verbal communication, including easy role-switching in a balanced and breakdown-free manner, i.e., with high reciprocity and speed of response, requires a preparatory phase. This early phase has been described as *tuning-in relationship*. It originates from music and denotes the process at the beginning of an improvisation: the participants involve in a process of synchronizing their inner time with the group – they *tune in* (Schütz 1951). In doing so, they establish a single rhythmic structure. The analogy is adapted by Gregory and Hoyt (1982) to describe the mutual adjustment of communication partners.

3 Methodology

In order to answer the research question, we conduct secondary data analysis (Dolata et al. 2015) of 18 videos of realistic advisory session from two identically designed within-subject experiments with a major Swiss bank (Nussbaumer et al. 2012). The experimental advisory sessions were conducted with a group of real retail-sector financial advisors and test advisees who were acquired through convenience sampling by postings on a university job marketplace. The test advisees were paid approx. 50 EUR (instructions of the local psychology department) for their participation of overall three hours including running through IT and non-IT conditions. Before the tests, the advisees received a 15-minute introduction, a hypothetical financial profile, and a scenario to follow. They should receive an advice on investing a given amount of money (up to 250'000 EUR), while considering a financial need (e.g., buying a car). The advisors were trained to use the introduced tool a few days in advance and additionally at the day of the experiment. The considered videos come from three different treatments (6 videos from each): (A) *No IT* – service conducted without no IT but with pen and paper, as usually in this bank, (B) *Tablet* – service conducted with use of a prototype deployed on a 10-inch tablet computer, (C) *Touch Table* – service conducted with use of a prototype deployed on a multi-touch tabletop device with a 30-inch flat display.

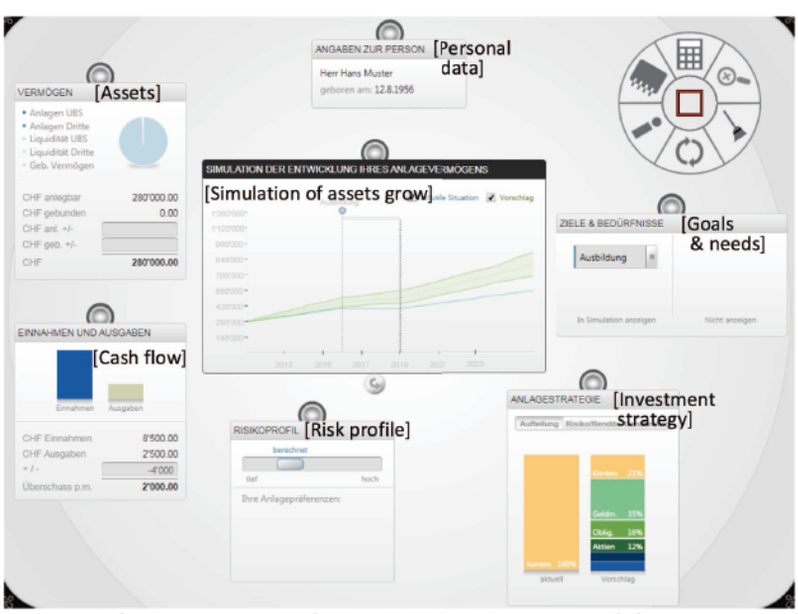

Figure 1 Design of the prototype Touch Table deployed on a 30-inch horizontal touch display.

The systems used in this research were developed in a user-centered design science research project with the goal of improving transparency in financial advisory encounters.

The *Tablet* and the *Touch Table* systems were designed according to state-of-the-art design principles and proven to possess as high usability as the pen-and-paper setting (Nussbaumer 2012). In particular, the prototypes implement the following features: shared information screen, "at one sight"-overview, flexible handling without explicated process steps, and personalization of information and visualizations (Nussbaumer 2012; Figures 1 and 2). This study uses the systems as vehicles to observe influence of a dedicated IT on the interactivity.

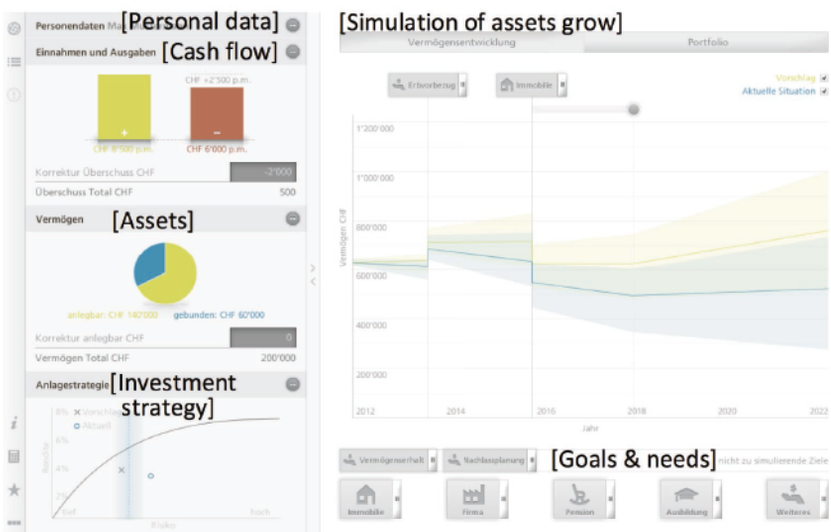

Figure 2 Design of the prototype Tablet on a 10-inch display

To counterbalance the order effects, we randomly assigned the advisees to start with either an IT-supported or conventional condition. Each session took approximately 30 minutes. The video footage was coded with ELAN (Brugman and Russel 2004). Two assistants coded the following layers: verbal activity of advisor and advisee, usage of tools, and further notes. High inter-rater agreement and reliability on a sample of eight five-minute segments assure the data quality (agreement: Cronbach's α=0.866; reliability: ICC=0.765; cf. Gwet (2012)).

All patterns reported in the subsequent chapter use the notion of a time segment. To observe dominating trends in communication, each advisory session was divided in five equal time segments. All measurements (advisees' and advisors' amount of talk, pauses) are then aggregated for each time segment. We present trend graphs using averaged numbers of all videos. The length of time segments (approx. 6 minutes) is chosen deliberately: it is longer than a statistical cyclic turn but shorter than any predefined stages of the advisory service.

In our results, we report on the data on verbal activity of the advisor and the advisee: (1) First, we consider patterns of silence, defined as moments when no one speaks. In this analysis, we only consider pauses longer than 1300 milliseconds, thus above the standard silence metric proposed in the literature (Jefferson 1989). We ignore silence moments occurring clearly due to the usage of the tools, as well as occurring during "technical breaks", i.e., we retain only *unfilled pauses*. The higher the amount of unfilled pauses, the lower the *speed of response*, and consequently the lower the interactivity. (2) Second, we make observations on the amount of talk in particular time segments. This enables for identification of particular speakers' dominance in the phases. If one of the speakers clearly dominates the stage and takes much floor in his or her turns, the participation of

the other collaboration partner naturally reduces, thus leading to reduced *reciprocity*, and consequently to a lower interactivity of collaboration.
In addition to reporting on the above measures, we calculate their average amplitudes: In particular, for each video we compute the difference between phases with the highest and the lowest values of the variable to obtain the video's specific amplitude. Amplitudes show how volatile the given variable is if observed across the time segments and videos. If taken together with the provided trends in communication, they illustrate whether a participant tends to dominate or be submissive in a particular phase.

4 Results

The results reported below deal with the *amount of talk* of the advisee and the advisor to show effects of IT on *reciprocity* in communication, as well as *unfilled pauses* to illustrate effects on the *speed of response*.

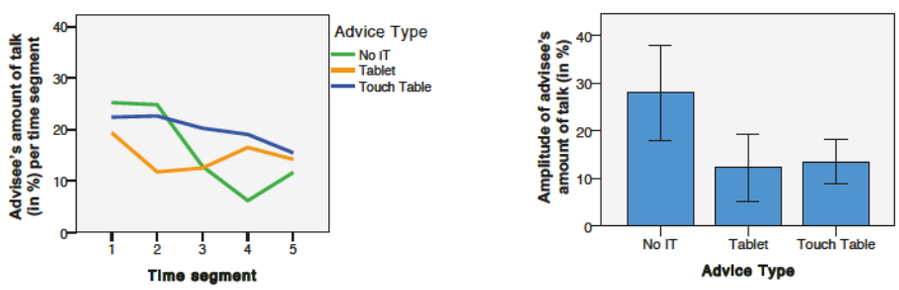

Figure 3 Left: Trends in advisee's amount of talk throughout the session.
Right: Averaged amplitudes of advisee's amount of talk (error bars: 95% CI)

As depicted in Figure 3 (left), advisee's amount of talk in all three conditions is rather low and oscillates on average around 20% of the overall duration of the advice. In the IT conditions, the variances are small, but we observe a considerable drop between second and fourth time segment in the *No IT* condition. This is reflected in amplitudes computations (see Figure 3, right). The *No IT* condition exhibits significantly higher amplitudes than both IT conditions (A vs. B: p=.006, t=4.484, df=5.000; A vs. C: p=.007, t=3.382, df=10.000), while there is no significant difference between the IT conditions.

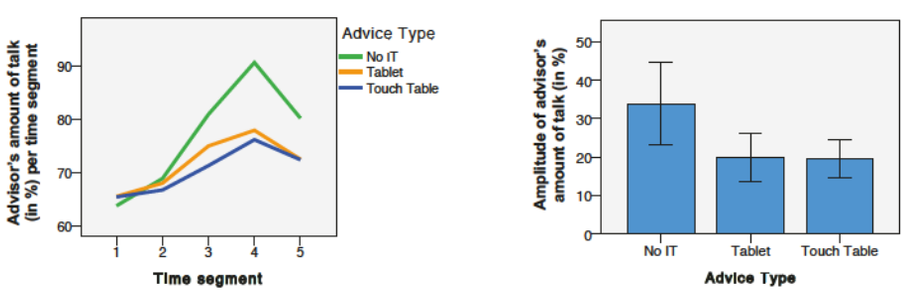

Figure 4 Left: Trends in advisor's amount of talk throughout the session.
Right: Averaged amplitudes of advisor's amount of talk (error bars: 95% CI).

Complementary trends occur in advisor's amount of talk which oscillates around 70% - 90% (Figure 4). This reflects the strong domination of the advisor in all settings. Interestingly, in each condition, the trend line reaches its high in the second last time segment. In the *No IT* case, this growth is twice as high as in the IT cases as illustrated by the average amplitude (A vs. B: p=.05, t=2.552, df=5; A vs. C: p=.017, t=3.115, df=6.983; cf. Figure 4, right).

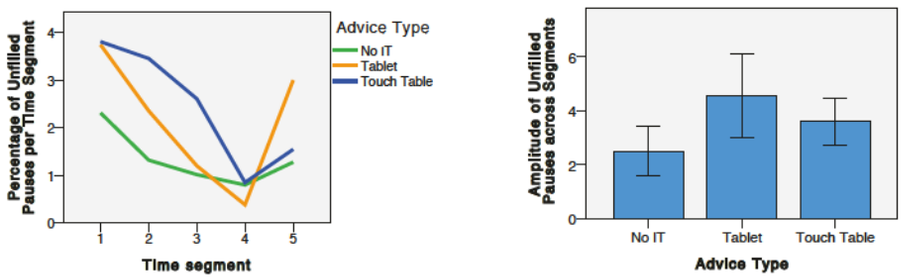

Figure 5 Left: Trends in occurrence of unfilled pauses throughout the advisory session. Right: Averaged amplitudes of amount of unfilled pauses (error bars: 95% CI)

The observations we make on silence (cf. Figure 5) add to the picture. Clearly, in each condition unfilled pauses occur more often in the early phase while getting less towards the end. Particularly, in the fourth time segment all conditions reach the same, very low, level of mutual silencing. Interestingly, at the beginning of the advisor session silence occupies in the IT conditions approx. 4 % of the overall time, whereas in the *No IT* case it reaches 2%. Reported fluctuations reflected by the amplitudes of unfilled pauses across time segments (A vs. B: p=.006, t=-4.516, df=5; A vs. C: p=.047, t=-2.264, df=10; cf. Figure 4, right).

5 Discussion and Conclusion

Coming back to the question whether IT enhances or lessens the encounter's *interactivity*, the above results provide a complex but consistent picture: the interactivity in IT-supported encounters suffers from lower *speed of response* in the early phases, but benefits from higher *reciprocity* later on. Table 1 summarizes this insight: (1) Regarding the *speed of response* – operationalized by the distribution of unfilled pauses – the early time segments of IT-supported encounters exhibit substantially less *speed of response* (more unfilled pauses) than the *No IT* case. In the later phase, the *speed of response* is comparable across the conditions. (2) Regarding the *reciprocity* – operationalized by the advisor's and advisee's amount of talk – all conditions exhibit similar patterns in the early phase of the encounter. However, in the later time segments, the advisor's dominance over the advisee grows and is substantially higher in the *No IT* condition than in the other ones. When the advisor takes 90% of the floor and leaves less than 10% to the advisee (i.e., just every tenth word is produced by the advisee) the chance of a reciprocal exchange is low. In the IT conditions this ratio changes for better: the advisee is able to take 20% of the floor (i.e., he can contribute every fifth word). Overall, the above analysis shows that IT impedes the interactivity in the early phases of the encounter, thus making the *joined problem solving* (Schwabe et al. 2016) difficult, but later it improves the interactivity defined as a dialogue-based feature (McMillan 2005; Bretz 1983; Rice 1984).

	Early phase	Late phase
Speed of response	IT < No IT	IT ≈ No IT
Reciprocity	IT ≈ No IT	IT > No IT
Interactivity	IT < No IT	IT > No IT

Table 1 Summary of the results regarding influence of IT on interactivity in advisory encounters

We postulate that designing for highly interactive collaboration during service encounters should be among the declared goals of this particular sub-discipline, along with the previously approached topics such as: knowledge transfer (Heinrich et al. 2014b), transparency (Nussbaumer et al. 2012), persuasion (Dolata et al. 2016), and empowerment

(Giesbrecht et al. 2016b). This paper is the first to show how modern and dedicated IT for advisory services can improve the quality of verbal communication between the advisor and the advisee. It confirms the essential role that adaption of communication practices plays for the appropriation of collaborative software in co-located meetings. The lens, we propose in this paper, points to specific problems undetectable with other methods traditionally employed in evaluation of novel designs, such as the technology acceptance model and related measure instruments.

In particular, we point to dimension of *time* in the sense of duration of the advisory service. We argue it shall be included in the discussion on what challenges and opportunities are brought with inclusion of novel IT into service encounters. While in the early collaboration phase, the presence of collaborative IT generates additional challenge for the interpersonal communication, the observation in the later phases show that IT also bears additional potential to improve the interactivity and consequently the collaboration quality.

The *tuning-in relationship* (Gregory and Hoyt 1982) provides an explanation to the observed patterns. While extending this metaphor, we argue that the IT tool in the encounter is an additional instrument added to the standard situation. In the early phases, the *tuning in* takes more time and is more intensive, thus the *speed of response* drops so visibly. As time goes by and the mutual adjustment progresses, hesitations diminish and a novel configuration and positioning is possible, i.e., novel patterns of communication emerge – ones that offer possibilities for more reciprocity. In other words, instead of two soloists in the ensemble, through introduction of an interactive IT tool, we get a trio. Consequently, the dyadic model of dominance and submission evolves and opens space for new forms of collaboration. This explanation sheds new light on the negative influence of IT on interpersonal communication in advisory settings reported earlier (Pearce et al. 2008; Kilic et al. 2016).

Consequently, we postulate to include *time* dimension into the design and use of collaborative systems, especially for the advisory scenario. Introducing IT for a short time may, in fact, have negative effects on the interpersonal communication that outstrip any positive effect of IT during the whole collaboration. If the implementation of such systems in practice is conducted along the lines of collaboration engineering (Briggs et al. 2013), it is necessary to consider redesign of service encounters to allow for appropriate *tuning in* in the early phases, i.e., specific scripts (ThinkLets) or set of restrictions need to be put in place in order to support effective tuning in – this will allow for the desired *joined problem-solving* effects to occur.

While the current research took the first explorative step towards understanding the role of interactivity in IT-supported service encounters, it suggests further potential in this area. Already the nascent results presented in here suggest the importance of this perspective for further design and research. Designers of dedicated IT for service encounters benefit from better view on the between the *problem-solving* character of such encounters and the character of interpersonal communication. Furthermore, they may consider the concept of *tuning in* helpful for leveraging the early phases of the encounter and streamlining the later ones, so that the participants can focus on problem solving once they are *tuned in*. Researchers in the area of collaborative systems benefit from the new, interactivity-oriented perspective on collaboration including the adaptation and operationalization of the *dialogue-based* view on *interactivity* for observing interpersonal processes in collaboration. Additionally, they may find it attractive to follow up on the research path proposed in here, which leaves the – so far more popular – interactivity

concepts focused on technology or self-perception. Consequently, we ask: Can one observe similar interactivity patterns in other scenarios than advisory services? How should we design IT systems to reduce the tuning in to the minimum? How does tuning in in collaborative setting differ from adapting to a new system in an individual usage scenario?

PAPER II

Tuning in to More Interactivity – Learning from IT Support for Advisory Service Encounters

Author: Mateusz Dolata, Gerhard Schwabe
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Year, Place: 2017, Berlin, Germany (De Gruyter)

Abstract
Advisory service encounters change their character from expertise provision to interactive problem solving, thus increasingly relying on mutual and intensive interaction between the advisor and the advisee: they turn into *interactive advisory service encounters*. Simultaneously, modern collaborative IT finds its way into service encounters as a method to engineer, enrich, and standardize them. An IT system equipped with interactive features may enhance the encounter's interactivity, but it may also limit it by capturing participants' attention. This study explores the influence of IT on the interactivity in advisory service encounters. It arrives at the conclusion that an extensive *tuning in* precedes a phase of enhanced interactivity in IT-supported advisory service encounters.

1 Introduction

Advisory service encounters are a wide-spread type of collaboration. They include patient-doctor or student-teacher counselling, as well as other forms of collaboration where an expert, i.e., advisor, provides advice on a predefined matter a layperson, i.e., advisee. In the era of instant information access, the role of advisory services has improved: whereas standard cases can be solved by the concerned persons based on the publicly available information, providing appropriate solutions in more complex and wicked situations requires expert knowledge and skills offered in form of advisory services. Consequently, the framing of advisory service encounters evolves from *expertise provision* to *interactive problem solving* – we propose the term *interactive advisory service encounters* (InterAdvise) to capture the new character of advisory encounters. By InterAdvise we mean an advisory service encounter which relies on mutual and interactive exchange between the advisor and the advisee and is oriented at rapport building and interactive problem solving, as opposite to one-sided information provision and selling. Because of this re-framing novel support tools and quality measures are necessary to enhance and assess advisory encounters.

Interactive problem solving requires both parties – the advisor and the advisee – to interact with each other when trying to understand the situation and elaborate a solution. In the face-to-face service encounters, interacting means, primarily, engaging in the mutual communication. Only if both partners establish an intensive mutual interaction, they can proceed with solving the problem. The concept of *interactivity* captures the intensity to which a two-way interaction is present in an encounter (Torres 1995).

The evolution towards InterAdvise and the digitization of services require modern and dedicated collaborative IT systems to enhance and enrich the collaboration. On the one hand, IT equipped with interactive features and being an interactive medium can be expected to improve the interactivity of the whole encounter. On the other hand, IT may capture so many collaborative resources (time, attention, etc.) from the human participants, that the two-way dialogue will stagnate, thus reducing the encounter's interactivity. Because of the rapid changes, the role IT plays for the interactivity of modern interactive-problem-solving encounters remains underexplored. IT more and more finds its way into advisory service encounters in form of tablet-based mobile apps or other systems, e.g., at financial institutions, doctor's offices, and insurance companies. The velocity of changes will enhance in the years to come – in our opinion, it is the most appropriate, if not the last moment to ask fundamental yet necessary questions about the impact of IT on collaboration in advisory service encounters. Consequently, the current study explores the following research question:
RQ: Does IT enhance or lessen the interactivity of advisory service encounters?

The answer to this question shall provide effective guidance on the design of modern IT for advisory service encounters thus helping designers and practitioners in the field. We define *IT support* not only as a technological phenomenon but as technology along with the practices it affords. Consequently, linking IT to the interactive problem solving and, especially, to the concept of interactivity provides a new lens applicable in similar collaborative scenarios. We apply, present, and argue for an operationalization of interactivity which can be propagated in other research. We set our scope to financial service encounters, e.g., encounters that clients attend if they want to make a significant investment. This type of encounters shares a lot with other advisory services such as patient-doctor or supervisor-student encounters: First, in investment advisory service,

there is much at stake including people's wealth. Second, mutual trust plays an important role in establishing a long-lasting relationship between the advisee and the advisor. Third, the interpersonal (high-touch) character of the session is shown to be more important for the advisor and the advisee (Mogicato et al. 2009; Schwabe and Nussbaumer 2009) than the technical and pragmatic issues (low-tech).

2 Related work

The changes in the advisory service encounters have two sources: (1) the popularization of the Internet as the basic source of information and, consequently, retreat from face-to-face services to on-line service provision for standard cases; (2) the introduction of IT into face-to-face advisory service encounters as support tools, especially, for documentation and data processing purpose. This study focuses entirely on the effects of IT within a face-to-face encounter. The related work sets adequate focus while establishing the framing of advisory service encounters as InterAdvise, discussing current IT design efforts, and presenting the interactivity as a feature of service encounters.

2.1 Advisory encounters as interactive problem solving

The changes in the service provision essentially impact the character of face-to-face advisory service encounters, especially in finances. Earlier, opening a deposit required the client to visit the bank, which gave opportunity for discussion about new offerings, e.g., more lucrative saving and investment products. However, nowadays opening a deposit requires just few clicks in the online banking. The grow of online-only banks and the rise of FinTech (Zavolokina et al. 2016a) illustrate how new channels affected services in finances: opening an account, taking loans, and making investments is already possible from home and there is more to come. Consequently, the face-to-face advisory service encounters are evolving: as the "standard cases" move online, the clients who attend to face-to-face encounter bring a "special case" – one that they consider wicked or complex; one, where they know that they want something but do not know what actions to perform to get it (Newell and Simon 1972); one that is called a *problem*. This has influence on the advisors and their job: instead of processing many standard situations, they deal with specific problems, where they need to offer solutions that satisfy the client as well as the bank, the advisors' employer.

So far the financial advisory service encounters have been framed from the information exchange perspective. It views a financial advisory service encounter as an sequential or iterative arrangement of information collection, information provision, and recommendation (Oehler and Kohlert 2009). Per this view, an advisory encounter should balance out the knowledge asymmetries between the partners and, thereby, enable for symmetric collaboration (Jungermann 1999; Jungermann and Fischer 2005; Novak 2009; Nussbaumer et al. 2012). More recent research from the area of non-commercial encounters indicates, however, that advisory encounters are in fact more like problem solving conducted in a collaborative manner (Schwabe et al. 2016). While we agree with this perspective, it leaves several issues open: Under what circumstances is an advisory encounter an instantiation of *problem solving*? What are the features of problem solving as opposite to information exchange models? What role does interactivity play in problem solving? We propose the interactive problem solving as a perspective which allows to approach those questions.

Interactive problem solving (IPS) is a problem solving approach popularized in diplomacy and negotiation solving (Kelman 1990, 1996). It has its origin in the notion of joint problem solving from the area of managerial decision taking and organizational conflict resolution (Pondy 1967; Swinth 1971; Zand 1972). The idea of joint search for solutions has attracted much attention in the diplomacy practice where it supplements the traditional and still official way of bargaining for concessions before declaring a compromise between the conflict parties (Kelman 1990). It builds upon the assumption that conflicts are symptoms of problems – while it is possible to stove off the conflict through negotiation, solving the problems requires another approach (Kelman 1996). First, IPS prescribes a joint identification of the desired state and the current state under consideration of causes and facts (Misselhorn 1978; Kelman 1996) – thereby, the parties jointly identify the problem if they do not see an obvious way to reach a desired state. Second, the participants jointly shape various solutions for the problem and evaluate them (Misselhorn 1978; Kelman 1996) – a solution describes the actions to be taken to reach the desired state. Third, the participants involve in positive and mutual enticement and reassurance on the way to develop a precise action plan including action steps and potential snags (Misselhorn 1978; Kelman 1996). IPS requires a supportive environment, which is continuously established and reassured by the parties (Kelman 1996) – the supportive character comes to live with specific individual and group interaction behaviors (Misselhorn 1978; Kelman 1996), which get expressed in gestures and verbal statements, i.e., in a smooth and interactive communication (Kelman 1996).

The modern financial advisory service encounters develop into IPS: Advisors are incentivized to establish mutual rapport and long-lasting relationships with the clients rather than selling individual products. Clients who attend advisory services are mostly in a new, possibly wicked situation, which may not fit into standard bank offering – they rather want to draw up an individualized solution which maps bank offering to their inquiry or addresses some of the fundamental issues rather than negotiate a concession. Importantly, each partner possesses relevant information: the advisee is the expert in the problem domain – she knows the situation and its limitation best; the advisor is the expert in the solution domain – he knows the range of available products and their flexibility. An InterAdvise offers a space to bring those knowledge sources together: From the very beginning, the advisor and the client engage in rapport-building behavior on a verbal and non-verbal level (Heinrich et al. 2014a). The advisee provides information she considers relevant for her case – the advisor establishes an early understanding of advisee's issue which allows to treat it as a problem (Kilic et al. 2017), e.g., financial security in the future. To address this problem, the advisor provides general information on the range of possibly relevant offerings and teaches the client about the details and factors that describe a possible solution (Heinrich et al. 2014b), e.g., investment and deposit products and their vulnerability to market conditions. When engaging with the matter, the client complements the previously provided information – be it self-induced or as an answer to advisor's inquiry (Kilic et al. 2017), e.g., her future professional aims. Simultaneously, some relevant offerings become increasingly specific and others get rejected as the advisee specifies her preferences or based on the advisor's assessment – a plan or plans emerge in form of actions to be taken so that the problem can be solved (Heyman and Artman 2015), e.g., an investment plan considering the professional aims. The encounter continues as a discussion of possible solutions, relevant differences and factors, specification of the plans, etc. The information coming from both parties enables for empathy and mutual enticement, such that the solution goes beyond a simple recommendation or negotiation.

This means, that the financial advisory services research needs to question the underlying quality assurance models relying on the linear and ordered information exchange (Jungermann 1999; Jungermann and Fischer 2005), and adapt a more flexible view as incorporating mutuality and interactivity (Steffensen 2013). Furthermore, it is essential to establish measurements, which capture the interactive and mutual character of InterAdvise.

2.2 IT in advisory service encounters

Reframing advisory encounters into InterAdvise bears consequences for the design of the encounters, including simple brochures as well as IT systems. In fact, modern IT seems predestined for supporting IPS. Whereas the traditional encounter was built around the concept of an information provision and recommendation, InterAdvise relies on the concepts of problem and solution – it requires the problem and the solution to be established in a collaborative and supportive manner. In the traditional encounter IT was built to support the advisor at providing most appropriate recommendation – IT reduced the amount of time spend on calculations or bookings and had essential role in facilitating the documentation; normally, the system was visible only to the advisor who could turn the screen towards the advisee if he wanted so (Arvola 2004). This type of systems still dominates in the field. However, recent studies on IT in service encounters focus increasingly on supporting collaboration – the systems presented in literature introduce effective help relying on such predicates as: (1) shared screen, (2) joint information spaces, (3) flexible and light-weight, non-rigid processes, (4) transfer of skills and understanding based on experience (Heinrich et al. 2014b; Schwabe et al. 2016; Dolata et al. 2016). IT developed along those lines was shown to improve knowledge transfer, transparency, empowerment of the advisors and advisees, as well as their motivation to tackle the addressed issues (Nussbaumer et al. 2012; Heinrich et al. 2014a; Schwabe et al. 2016). It was also used to generate better visualizations and to streamline and standardize the experience across encounters (Heyman and Artman 2015). Nevertheless, studies repeatedly report on the problems of such modern systems regarding the quality of communication (Schwabe and Nussbaumer 2009; Kilic et al. 2016). Depending on its features and usage scenario, IT may destroy entrance sequences in advisory encounters (Pearce et al. 2008) or introduce hesitations and unnecessary repair sequences in implicit and explicit communication (Kilic et al. 2016). This reflects the basic dilemma of collaboration support (Briggs et al. 2013): IT has advantages in terms of process and product support, and enforces quality standards and practices, but bears great challenges if it comes to the quality of communication between people.

But it is exactly the smooth communication between the participants that is essential for IPS to happen. How is it possible that IT developed with collaboration in mind may in fact compromise on the quality of communication being so essential to mutual and supportive collaboration? Understanding the role of IT for the communication quality in collaborative situation is necessary and will remain an ever-open topic. With this study, we want to add a piece of knowledge that may help closing this gap.

2.3 Interactivity in advisory service encounters

Successful problem solving in a collaborative situation depends strongly on the interactivity of the ongoing collaboration (Steffensen 2013). While *interaction* designates the action in which two or more objects have effect on each other, *interactivity* describes the quality and intensity of this action, i.e., of the relation between two objects or systems

(McMillan 2005; Steffensen 2013). Interactivity has been a widely-discussed topic and plays a central role in such areas as communication science, computer science, marketing and advertising just to mention a few (Johnson et al. 2006). There exist countless definitions of interactivity and all add a new perspective to this complex phenomenon (McMillan 2005): (1) Some researchers focus on interactive features of media (Markus 1987) or even single interfaces (Albert et al. 2004) and use interactivity as classification criterion for artifacts. (2) Others define interactivity as experiential measure, i.e., they define the interactivity of an experience through the self-reports of participants or users (Burgoon et al. 1999). (3) Finally, there exist a range of definitions that derive interactivity from observable qualities of the actual interaction. In this category fall definitions using (3a) the *message-based view*, in which the interdependence between consecutive messages is considered as relevant (Rafaeli and Ariel 2007), and (3b) the *dialogue-based view* that emphasize the conversational nature of interactions (McMillan 2000; Johnson et al. 2006). Following the latter view, an interactive encounter (3b-I) exhibits reduced time lags between the exchanges of the participants or objects (Bretz 1983) and (3b-II) makes the role of sender and recipient of a message easily interchangeable (Rice 1984). In other words, both conversation participants often take floor without additional lags between the verbal statements or actions.

This study follows the dialogue-based view on interactivity and uses a particular definition proposed by Johnson et al. (2006) for several reasons: (1) we observe real, face-to-face communication framed as dialogue, (2) this view and the according definition attract more and more attention in the recent years, especially in the area service science, to approach the topic of novel service encounters, (3) the definition was designed to bridge the gap between technology- and human-oriented concepts of interactivity. Johnson et al. see the general interactivity as derivative from the non-mediated (behavioral) interaction and mediated (technology-based) interaction, which both result in an experience of interactivity. Johnson et al. account for *reciprocity*, *responsiveness* (being a specific form of reciprocity), *nonverbal behavior*, and *speed of response* as dimensions that define interactivity in all interactions.

Reciprocity is widely acknowledged in the interactivity literature and is put on a par with "dialogue", "participate", "iterative", "two-way communication", "actions and reactions", and "talking back" (cf. Johnson et al. 2006, for further references). In a reciprocal exchange, participants engage in a more balanced communication where they alternately play the role of sender and receiver, as opposite to a monologue with a single dominating part. If messages in an exchange build content wise upon each other, we talk about responsiveness. *Speed of response* refers to the extent to which messages in an exchange occur in real time or with delay. A minimum delay contributes to the continuity of the exchange, but delayed responses, signalized by breaks and pauses, hinder communication flows, lead to information losses, and reduce the overall interactivity of the exchange (Johnson et al. 2006). Also, the definitions mentioned earlier (3b-I and II) stress the role of reciprocity and speed of response, as central and most settled ones within the dialogue-based conceptualization of interactivity.

Importantly, establishing a smooth verbal communication, including easy role-switching in a balanced and breakdown-free manner, i.e., with high reciprocity and speed of response, requires a preparatory phase. This early phase has been described as *tuning-in relationship*. It originates from music and denotes the process at the beginning of an improvisation: the participants involve in a process of synchronizing their inner time with the group – they *tune in* (Schütz 1951). In doing so, they establish a single rhythmic

structure. The analogy is adapted by Gregory and Hoyt (1982) to describe the mutual adjustment of communication partners.

Overall, the current study leverages the notion of interactivity presented above to describe the influence of modern IT support for advisory encounters on those encounters. The current changes in the market and service provision turn traditional information-exchange advisory encounters into InterAdvise. This requires engagement and intensive interaction between the advisor and the advisee to enable for a supportive environment as well as mutual enticement and reassurance practices to emerge, which are essential to IPS. However, IT systems developed along the lines of problem solving and, especially, the processual dimension of IPS were reported to compromise exactly on the human interaction. The available studies focus on single breakdown episodes and miss to point to the larger dimensions of communication that get affected (Mogicato et al. 2009; Kilic et al. 2016) and do not explain the problems in terms of communication mechanisms, but reduce them to usability issues (Pearce et al. 2008; Heinrich et al. 2014a) This paper explores the impact of modern IT systems on the interactivity in the advisory service encounters in terms of repetitive patterns and describes a general communication mechanism that explains the observations.

3 Methodology

To answer the research question, we conduct secondary data analysis (Dolata et al. 2015) of 18 videos of realistic advisory session from two identically designed within-subject experiments with a major Swiss bank (Nussbaumer 2012). The experimental advisory sessions were conducted with a group of real retail-sector financial advisors and test advisees who were acquired through convenience sampling by postings on a university job marketplace. The test advisees were paid approx. 50 EUR (instructions of the local psychology department) for their participation of overall three hours including running through IT and non-IT conditions. Before the tests, the advisees received a 15-minute introduction, a hypothetical financial profile, and a scenario to follow. They should receive an advice on investing a given amount of money (up to 250'000 EUR), while considering a financial need (e.g., buying a car). The advisors were trained to use the introduced tool a few days in advance and additionally at the day of the experiment. They were aware of all the functionalities, the system provides, and had several options to try it out before the experiment. The considered videos come from three treatments (6 videos from each): (A) *No IT* – service conducted without no IT but with pen and paper, as usually in this bank, (B) *Tablet* – service conducted with use of a prototype deployed on a 10-inch tablet computer, (C) *Touch Table* – service conducted with use of a prototype deployed on a multi-touch tabletop device with a 30-inch flat display.

The systems used in this research were developed in a user-centered design science research (Hevner and Chatterjee 2010) project with the goal of improving transparency in financial advisory encounters (Nussbaumer 2012). The *Tablet* and the *Touch Table* systems were designed in accordance with the state-of-the-art design principles and proven to exhibit the same level of usability as the pen-and-paper setting (Nussbaumer 2012). The prototypes implement the following features: shared information screen, "at one sight"-overview, flexible handling without explicated process steps, and personalization of information and visualizations (Nussbaumer 2012; Figure 6). The Touch Table prototype uses the idea of widget as main design element as follows: (1) the particular widgets (e.g., "assets" or "personal data") are by default distributed across the available space and

provide modular functionality used during the advisory session, (2) the widgets are interconnected such that information change in one widget (e.g., income in "cash flow") influences information presented elsewhere (e.g., in the "simulation of assets grow"), (3) all widgets are visible at all times, can be replaced and zoomed-in to present more specific information. The Tablet prototype uses the same visualizations and algorithms, but – due to space limitations – reinterprets the widget metaphor as follows: (1) the widgets are placed next to each other and take the whole available space, (2) some widgets must first be opened by a click on the title to show their content (e.g., "personal data" in Figure 6, right) (3) the widgets can be moved only in the predefined areas, e.g. in the upper right corner for zoom-in (e.g., in Figure 6, right, the widget "simulation of assets grow" is zoomed-in) or in the left panel for zoom-out (e.g., "assets"), (4) the logics and interconnection between widgets is the same as in the Touch Table prototype. Nussbaumer (2012) provides an exact description of the prototypes and the development process thereof. This study uses the systems solely as vehicles to observe influence of a dedicated IT on the interactivity.

To counterbalance the order effects, we randomly assigned the advisees to start with either an IT-supported or conventional condition. Each session took approximately 30 minutes. The video footage was coded with ELAN (Brugman and Russel 2004). Two assistants coded the following layers: verbal activity of advisor and advisee, usage of tools, and further notes. High inter-rater agreement and reliability on a sample of eight five-minute segments assure the data quality (agreement: Cronbach's α=0.866; reliability: ICC=0.765; cf. Gwet (2012)).

All patterns reported in the subsequent chapter use the notion of a time segment. To observe dominating trends in communication, each advisory session was divided in five equal time segments. All measurements (advisees' and advisors' amount of talk, pauses) are then aggregated for each time segment. We present trend graphs using averaged numbers of all videos. The length of time segments (approx. 6 minutes) is chosen deliberately: it is longer than a statistical cyclic turn but shorter than any predefined stages of the advisory service. In our results, we report on the verbal activity of the participants: (1) First, we consider patterns of silence, defined as moments when no one speaks. In this analysis, we only consider pauses longer than 1300 milliseconds, thus above the standard silence metric proposed in the literature (Jefferson 1989). We ignore silence moments occurring clearly due to the usage of the tools, as well as occurring during "technical breaks", i.e., we retain only *unfilled pauses*. The higher the number of unfilled pauses, the lower the *speed of response*, and consequently the lower the interactivity. (2) Second, we make observations on the amount of talk in the single time segments. This enables for identification of a speakers' dominance in the phases. If one of the speakers clearly dominates the stage and takes much floor in his or her turns, the participation of the other collaboration partner naturally reduces, thus leading to reduced *reciprocity*, and consequently to a lower interactivity of collaboration. In addition to reporting on the above measures, we calculate their average amplitudes: For each video, we compute the difference between phases with the highest and the lowest values of the variable to obtain the video's specific amplitude. Amplitudes show how volatile the given variable is if observed across the time segments and videos. If taken together with the provided trends in communication, they illustrate whether a participant tends to dominate or be submissive in a single phase.

Figure 6 Design of the prototypes – Left: Touch Table deployed on a 30-inch touch display, Right: Tablet prototype on a 10-inch touch display.

4 Results

The results deal with the *amount of talk* to show effects of IT on *reciprocity* in communication, as well as *unfilled pauses* to illustrate effects on the *speed of response*.

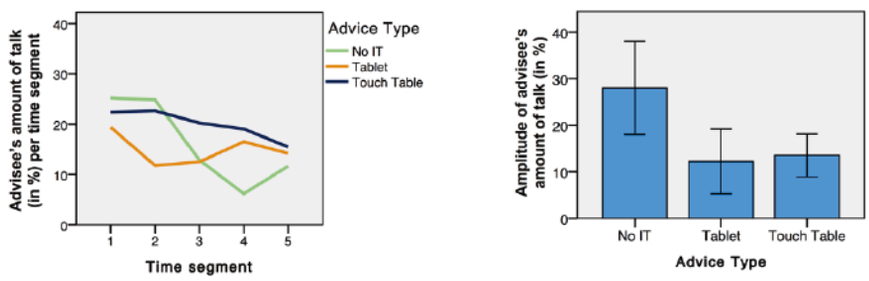

Figure 7 Left: Trends in advisee's amount of talk throughout the session. Right: Averaged amplitudes of advisee's amount of talk (error bars: 95% CI)

As depicted in Figure 7 (left), advisee's amount of talk in all three conditions is rather low and oscillates on average around 20% of the overall duration of the advice. In the IT conditions, the variances are small, but we observe a considerable drop between second and fourth time segment in the *No IT* condition. This is reflected in amplitudes computations (Figure 7, right). The *No IT* condition exhibits significantly higher amplitudes than the IT conditions (A vs. B: p=.006, t=4.484, df=5.000; A vs. C: p=.007, t=3.382, df=10.000), while there is no difference between the IT conditions.

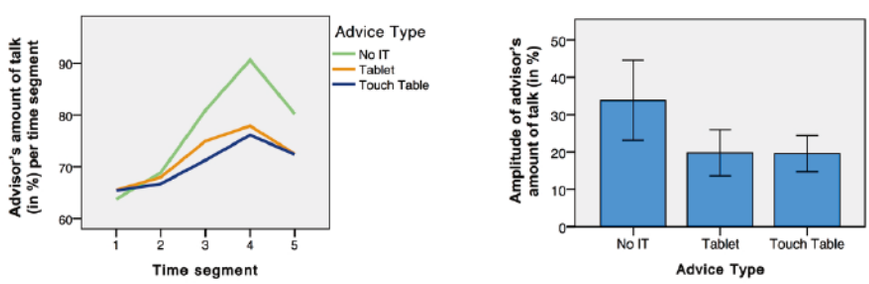

Figure 8 Left: Trends in advisor's amount of talk throughout the session. Right: Averaged amplitudes of advisor's amount of talk (error bars: 95% CI).

Complementary trends occur in advisor's amount of talk which oscillates around 70% - 90% (Figure 8). This reflects the strong domination of the advisor in all settings. Interestingly, in each condition, the trend line reaches its high in the second last time segment. In the *No IT* case, this growth is twice as high as in the IT cases as illustrated by the average amplitude (A vs. B: p=.05, t=2.552, df=5; A vs. C: p=.017, t=3.115, df=6.983; cf. Figure 8, right).

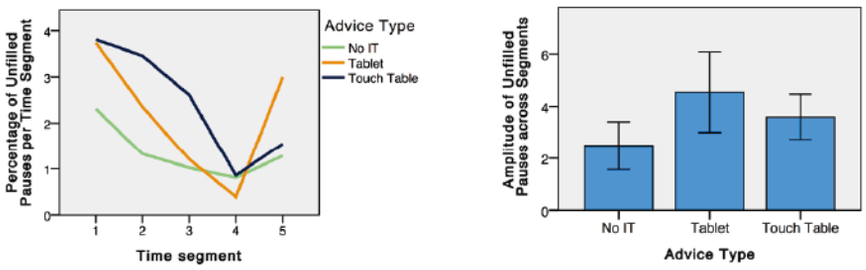

Figure 9 Left: Trends in occurrence of unfilled pauses throughout the advisory session. Right: Averaged amplitudes of number of unfilled pauses (error bars: 95% CI)

The observations we make on silence (cf. Figure 9) add to the picture. Clearly, in each condition unfilled pauses occur more often in the early phase while getting less towards the end. Particularly, in the fourth time segment all conditions reach the same, very low, level of mutual silencing. Interestingly, at the beginning of the advisor session silence occupies in the IT conditions approx. 4 % of the overall time, whereas in the *No IT* case it reaches 2%. Reported fluctuations reflected by the amplitudes of unfilled pauses across time segments (A vs. B: p=.006, t=-4.516, df=5; A vs. C: p=.047, t=-2.264, df=10; cf. Figure 9, right).

5 Discussion and Conclusion

The above results point to the fact, that the IT-prototypes introduced into the InterAdvise have essential impact on the speed of response and on the reciprocity of interaction. Previous literature either criticized IT for disturbing communication in advisory encounters while describing particular episodes (Kilic et al. 2016), pointed to bad usability design as the crucial negative factor (Pearce et al. 2008), or defined design factors as essential for enabling positive work and communication practices (Heinrich et al. 2014b), this study makes clear that a better picture emerges if the observed patterns are put in relation with communication mechanisms and holistic features of interaction such as its interactivity. This section, first, elaborates the relationship between IT and interactivity in the advisory service encounters in more detail, and, second, discusses what it means to design for InterAdvise.

5.1 Interactivity and IT in advisory service encounters

Coming back to the question whether IT enhances or lessens an advisory encounter's *interactivity*, the above results provide a complex but consistent picture: the interactivity in IT-supported encounters suffers from lower *speed of response* in the early phases, but benefits from higher *reciprocity* later. Table 25 summarizes this insight: (1) Regarding the *speed of response* – operationalized by the distribution of unfilled pauses – the early time segments of IT-supported encounters exhibit substantially less *speed of response* (more unfilled pauses) than the *No IT* case. In the later phase, the *speed of response* is comparable across the conditions. (2) Regarding the *reciprocity* – operationalized by the advisor's and advisee's amount of talk – all conditions exhibit similar patterns in the early phase of the encounter. However, later, the advisor's dominance over the advisee grows and is substantially higher in the *No IT* condition than in the other ones. When the advisor takes 90% of the floor and leaves less than 10% to the advisee (i.e., just every tenth word is by the advisee) the chance of a reciprocal exchange is low. In the IT conditions this ratio changes for better: the advisee can take 20% of the floor (i.e., she contributes every fifth word). Overall, the above analysis shows that IT impedes the interactivity in the early

phases of the encounter, thus making the *joint problem solving* (Schwabe et al. 2016) difficult, but later it improves the interactivity defined as a dialogue-based feature (McMillan 2005; Bretz 1983; Rice 1984).

	Early phase	Late phase
Speed of response	IT < No IT	IT ≈ No IT
Reciprocity	IT ≈ No IT	IT > No IT
Interactivity	**IT < No IT**	**IT > No IT**

Table 2 Summary of the results on the influence of IT on interactivity in advisory encounters

The results point to dimension of *time* in the sense of duration of the advisory service as the crucial factor to be considered before deciding on whether IT has positive or negative impact on the encounter. We argue, it shall be included in the discussion on what challenges and opportunities are brought with inclusion of novel IT into service encounters. While in the early collaboration phase, the presence of collaborative IT generates additional challenge for the interpersonal communication, the observation in the later phases show that IT also bears additional potential to improve the interactivity and consequently the collaboration quality. The *tuning-in relationship* (Gregory and Hoyt 1982) provides an explanation to the observed patterns. While extending this metaphor, we argue that the IT tool in the encounter is an additional instrument added to the standard situation. In the early phases, the *tuning in* simply takes more time, thus the *speed of response* drops. As time goes by and the mutual adjustment progresses, hesitations diminish and a novel configuration and positioning is possible, i.e., novel patterns of communication emerge – ones that offer possibilities for more reciprocity. In other words, instead of two soloists in the ensemble, through introduction of an interactive IT tool, we get a trio. Consequently, the dyadic model of dominance and submission evolves and opens space for new patterns. This explanation sheds new light on the negative influence of IT on interpersonal communication in advisory settings reported earlier (Pearce et al. 2008; Kilic et al. 2016).

Consequently, we postulate to include *time* dimension into the design and use of collaborative systems, especially for the advisory scenario. Introducing IT which gets used only for a short time may, in fact, have negative effects on the interpersonal communication that outstrip any positive effect of IT. However, if the IT gets used for longer than the early stages of the advisory service, it will unveil its positive effect and support more interactive exchange. For instance, it may be necessary to consider redesign of service encounters to allow for appropriate *tuning in* in the early phases, i.e., specific behavioral scripts (e.g., ThinkLets – Briggs et al. (2013)) or set of restrictions need to be put in place to support effective tuning in.

5.2 IT-supported interactive advisory service encounters

Given the evolution of service encounters and the definition of InterAdvise, we postulate that any changes and redesign of advisory services shall consider their increasingly interactive character. Specifically, the design of dedicated IT needs to move away from the information exchange models (Jungermann 1999; Jungermann and Fischer 2005; Oehler and Kohlert 2009). Instead, designing for interactive problem solving (Misselhorn 1978; Kelman 1990, 1996) bears more potential and is likely to produce IT which will survive the currently ongoing evolution of advisory service encounters and gets finally adopted in practice as opposite to systems proposed earlier (Mogicato et al. 2009; Schwabe and Nussbaumer 2009). Such IT will primary support collaboration between the parties

understood as joint specification of the problem and common definition of actions necessary to tackle the problem. It will allow for emergence of mutual rapport and reassurance through signalizing the benefits of jointly elaborated solution for the client and for the bank (Misselhorn 1978). Finally, it will form an invitation for the advisee to interact with the advisor and with the system itself.

Whereas the redesign of service encounter, including IT developed for use in advisory service encounters, has so far approached such topics as knowledge transfer (Heinrich et al. 2014b), transparency (Nussbaumer et al. 2012), and empowerment (Giesbrecht et al. 2016b), this study points to less invasive measurements. Measuring the intensity of verbal interaction can be easily done without the necessity to assess the service based on surveys or other standard evaluation methods. In fact, IT can be even used to automatically collect data on advisor's and advisee's verbal activity and compare it against various baselines. This opens new possibilities for the evaluation of real advisory services conducted in banks. Monitoring whether the clients interact with the advisors and how the advisors go about their dominating position may provide interesting data for the management in the financial institutions. Finally, monitoring the interactivity of the encounters may provide essential information on the performance of support systems and procedures introduced in the encounter: Are they in line with the evolution towards InterAdvise or do they push the advisee back to the position of a supplicant and the advisor back to the position of information provider?

5.3 Limitations and Outlook

This paper is the first to show how modern and dedicated IT for advisory services can improve the quality of verbal communication between the advisor and the advisee. It confirms the essential role that adaption of communication practices plays for the appropriation of collaborative software in co-located meetings. The lens, we propose in this paper, points to specific problems undetectable with other methods traditionally employed in evaluation of novel designs, such as the technology acceptance model and related measure instruments. At the same time, the limitations of the current study result from the choice of interactivity as the theoretical lens: the variety of definitions of interactivity available in the psychology and communication studies. The simplistic notion chosen for this paper does not capture the meaning of various non-verbal and verbal signs, but focuses solely on their presence: it makes the method easily applicable and reproducible, but also vulnerable to oversimplifications regarding the complex nature of face-to-face communication. Consequently, the observations need backing from the theory of communication (e.g., tuning in). Furthermore, we use realistic but still experimental recordings to conduct the analysis – obtaining recordings from real advisory sessions is difficult due to privacy reasons and confidentiality rules for financial institutions. Consequently, we encourage scientists to replicate the study in a real context, with real clients or with other IT support systems.

While the current research took the first explorative step towards understanding the role of interactivity in service encounters and proposed the notion of InterAdvise, it points to further potential in this area. The results presented in here suggest the importance of this perspective for further design and research. Designers of dedicated IT for service encounters benefit from better view on the between the *problem-solving* character of such encounters and the character of interpersonal communication. Furthermore, they may consider the concept of *tuning in* helpful for leveraging the early phases of the encounter and streamlining the later ones, so that the participants can focus on problem solving once

they are *tuned in*. Researchers around collaborative systems benefit from the new, interactivity-oriented perspective on collaboration including the adaptation and operationalization of the *dialogue-based* view on *interactivity* for observing interpersonal processes in collaboration. Additionally, they may find it attractive to follow up on the research path proposed in here, which leaves the – so far more popular – interactivity concepts focused on technology or self-perception. Consequently, we ask: Can one observe similar interactivity patterns in other scenarios than advisory services? How should we design IT systems to reduce the tuning in to the minimum? How does tuning in in collaborative setting differ from adapting to a new system in an individual usage scenario?

PAPER III

How IT-artifacts disturb advice giving – Insights from analyzing implicit communication

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Publication: Proceedings of the 49th Hawaii International Conference on System Sciences
Year, Place: 2016, Koloa, Hawaii, USA

Abstract
It has been shown that IT disturbs interpersonal communication in co-located advisory services. The central property of such encounters is their interpersonal character and therefore effective communication is essential for high quality service. While the available literature identifies some factors influencing the communication, the role of implicit communication and how IT influences it remains underexplored. In this paper we provide an analysis of 24 realistic financial service encounters. We observe unexpected conversation patterns that require further clarification, e.g., clients who abruptly stop talking or advisors who interrupt the clients. We identify the feedback in conversation as the communication component that suffers a lot from the introduction of IT. In the conventional advisory setting we did not observe those critical episodes. We discuss our findings in light of IS, CSCW, and communication science literature. The findings have implications for the future design of IT-supported service encounters.

1 Introduction

More and more financial institutions move towards use of collaborative systems in their advisory services. From managers' perspective, such systems assure the quality of service provision across advisors. From the advisors' perspective, they support solution finding, enable co-creation practices, and have potential to promote understanding and clients involvement (Schmidt-Rauch and Nussbaumer 2011).At the same time, advisors fear that IT may negatively influence communication and rapport building between them and the client (Schwabe and Nussbaumer 2009). Existing literature points to a number of communication problems in service encounters caused by IT such as missing attunement between conversation partners (Pearce et al. 2008) or reduced eye contact (Heinrich et al. 2014a)[1]. This goes in line with the view that IT may disturb conversation in service encounters. The available literature defines the problems of communication at a general level and does not consider its highly complex structure. Consequently, we are still lacking a clear and consistent picture of which conversational components are particularly affected by IT and how this impacts the behavior of the participants. This paper points to the feedback in conversation as the component that suffers a lot in IT-supported service encounters. Feedback problems may limit the ability to assess the state of the conversational partner. Consequently, the usual communicational structure disintegrates, which causes major and unexpected breakdowns during the encounter. We follow the paradigm of conversation analysis (Wooffitt 2005) extended by the special attention we pay to its multimodal character (Bezemer and Jewitt 2010). This allows for an in-depth look at such situations and rich description of conversational breakdowns.

Enjoyable and breakdown-free communication plays a central role in service encounters and helps with achieving their twofold goals: Service encounters are problem-solving procedures and, simultaneously, they shall strengthen the relationship between the advisor and the client. A typical encounter starts with needs elicitation, a crucial phase for the problem solving and the rapport building: Through the information transfer from the client to the advisor it influences the personalization of the service. At the same time, behavioral patterns settle down and influence the empathizing between the parties (Roy 2013) – a tuning-in relationship emerges. Consequently, the needs elicitation phase in service encounters requires close consideration. To our best knowledge, a focused and consistent analysis of communication patterns in IT-supported needs elicitation is still missing.

The study reported in this paper is a part of a larger research program oriented at understanding and improving the collaboration between clients and advisors in co-located financial service encounters through IT. The systems developed over years enhanced various aspects of the advisory services (Schmidt-Rauch and Nussbaumer 2011; Nussbaumer et al. 2012; Giesbrecht et al. 2014; Heinrich et al. 2014b). However, we, also, observed frequent occurrence of problematic and unexpected conversational episodes. In this study we focus on analyzing such problematic episodes as the available literature misses a settled and clear view on them.

Given that background, we assume that IT has negative impact on conversation and ask the following research question: *How does IT infusion disturb the conversation in co-located financial advisory encounters?* We address this issue in an exploratory manner: based

[1] As in the current paper, the referenced studies use single display groupware as a way to support advisory sessions. All approaches include a shared artifact (e.g., tabletop, shared desktop screen etc.) as a way to support the dyadic co-located collaboration between the advisor and the customer. With „IT" we refer to such systems throughout this paper.

on analysis of 24 video recordings of realistic financial advisory sessions, we provide an in-depth analysis of how IT, represented by two alternative designs, introduced into the encounters, affects the way of in which communication emerges, how do the conversation partners adapt to the changes induced by IT, and how this influences the subsequent flow of collaboration. We have identified patterns occurring regardless of particular differences in the conceptual design of the IT prototypes. Based on our findings, we claim that inclusion of IT in advisory services shall consider not only the explicit information exchange, but also the implicit communication, e.g., gesture, semi-language, or mimics.

2 Related Work

We structure our related work section around the concepts of service support by means of IT, coordination in collaboration extensively discussed in the field of *computer supported cooperative work* (CSCW), and the conversational feedback mechanisms from communication sciences and linguistics. Those views provide rich background for analysis of particular episodes.

2.1 IT-supported advisory services

Advisory services play an important role in modern service provision, thus following the ideas of service-dominant logic (Vargo and Lusch 2004) and value co-creation (Schmidt-Rauch and Nussbaumer 2011). A financial service encounter forms a specific instance of institutional talk (Drew and Heritage 1992a) - involved participants follow goals that are tied to their institution-relevant identities – in our case, the ones of a client and an advisor. The format, also, defines what is a valuable content. Most people, even if they have never been to an advice at a bank, have particular expectations on its structure and act accordingly, while following an interactional script: in the financial advisory service, the client acts as an expert of the problem space while the advisor provides knowledge of the solution space; they exchange respective information and establish mutual rapport (Oehler and Kohlert 2009).

The topic of advisory service support attracted attention of CSCW and IS research. Several approaches were proposed to support the participants of various service encounter in such settings as: financial institutions (Nussbaumer et al. 2012; Heinrich et al. 2014a), travel agencies (Schmidt-Rauch et al. 2010), city councils (Giesbrecht et al. 2014), medical counseling by GPs (Pearce et al. 2008), or in mobile setting at the client's property (Giesbrecht et al. 2015). In most cases, in line with Dix's (1994) framework, the use of single display groupware as a shared artifact of work has been proposed and shown to improve: transparency (Nussbaumer et al. 2012), customer satisfaction (Schmidt-Rauch et al. 2010; Nussbaumer et al. 2012), and stimulation of the client (Novak and Schmidt 2009). However, IT may also have detrimental effects on the relationship and communication (Heinrich et al. 2014a), and, thus, advisors fear it (Nussbaumer et al. 2012). Research addresses these issues by explaining the moderating variables characteristic for IT-supported encounters, such as: sitting position of the participants (Heinrich et al. 2014a), the rapport building behavior of the personnel (Giebelhausen et al. 2014), and the design and form factor of the particular system (Pearce et al. 2012).

2.2 Micro-coordination in conversations

Recent developments in the field of CSCW bring a low-level view on the processes of collaboration efforts: micro-coordination (Lee et al. 2012). This view stresses the

experiential character of collaboration and points to the relevance of micro-decisions for successful communication. In the very basic sense, coordination in dyads is the effort made so that activities of one side are predictive of symmetric activities of the other side (Ricard 1993; Rotondo and Boker 2002): turn of one participant shall be predictive for the turn of another participant regarding its time of occurrence, topic, length, etc. In spontaneous dialogue, joint coordination behaviors emerge over time (Tickle-Degnen and Rosenthal 1990), in particular during the tuning-in phase (Gregory and Hoyt 1982). In institutional talk, however, their establishment may be easier if the participants share a common interactional script (Drew and Heritage 1992a). Importantly, the role of coordination grows as the interaction proceeds (Tickle-Degnen and Rosenthal 1990). McGarva and Warner (2003) argue that coordination, being a conversational habit, needs to be "learnt" in the early phases of a conversation: interactional behaviors change only gradually – the longer a behavior persist the more difficult it is to change. This supports the argument that behaviors in the needs elicitation phase are very important. When IT is introduced in the setting, it may redefine the script of the situation and impede the natural attunement in the early phase of the encounter (Pearce et al. 2008).

As coordination consists of an infinite set of discrete behaviors, the impediment of IT may show itself in seemingly irrelevant but influential subtleties. Therefore, the processes under consideration require a thorough observation and analysis (Cappella 1981; Tickle-Degnen and Rosenthal 1990). When talking, people use a set of mechanisms to coordinate their actions. This includes feedback signals sent on a so-called backchannel to exhibit listener responsiveness to the speaker (Kraut et al. 1982). Based on those signals, the speaker makes assumptions about the state of the listener, adapts his contributions appropriately, and, consequently, contributes to the efficiency and harmony of the conversation.

2.3 Feedback channel

The concept of feedback channel extends the conduit metaphor (Reddy 1979): the reception of a message is acknowledged on the feedback channel (Brennan et al. 2010). In fact, listeners can exercise partial control of the conversation through providing feedback. They use many different signals such as: explicit utterance, gesture, eye-gaze, or semi-language ("mhm…"). In this study we attend to such signals and analyze their influence on the course of communication and collaboration. In particular, we pay attention to how speakers assess the interactional capacity of the listener based on the feedback (Luff and Jirotka 1998). With growing ambiguity and implicitness of the signal, the reactions of the speaker get more unpredictable (Kraut et al. 1982; Harrigan 1985; Drew and Heritage 1992a).

The feedback channel is crucial for the speaker: Without knowledge about the listener's state speakers produce less accurate (Feffer and Suchotliff 1966), less coherent and less structured (Kent et al. 1978), or less efficient contributions (Krauss et al. 1977). Inversely, with more feedback, speakers talk more and provide more data (Matarazzo et al. 1964; Kraut et al. 1982). Speakers make important assumptions based on the feedback signals: in case, the listener does not maintain constant eye gaze, speakers assume that they are boring for the listener (Fussell 1995) - attentive listeners provide vivid feedback (Brennan et al. 2010). The positive effect of feedback depends also on the expectations speaker has about the listener: If the speaker assumes and in fact encounters an attentive listener, he will be more engaged and will talk more than otherwise (Brennan et al. 2010).

CSCW field acknowledged the importance of feedback in design of IT for computer-mediated communication (Herring 1999), distributed collaboration (Ishii and Kobayashi 1992), collective games (Lee et al. 2012), and mobile notifications (Fischer et al. 2013). Still, the issue of how IT applied in institutional settings changes the use of backchannel feedback remains underexplored. In this paper, we aim at making a first step in this direction.

3 Methodology

To answer the research question we employ a conversation analysis (Wooffitt 2005) of video recordings. This approach fits our research question because it is proposed to capture and analyze social interaction in realistic situations, especially, in institutional interaction (Wooffitt 2005). Consequently, we collect realistic data that reflects genuine advisory sessions. Accordingly, in the recorded sessions, we leave much freedom to the participants. Our goal is to make holistic and rich observations and compare particular episodes from all conditions. Therefore, we pay attention to the explicit verbal communication and to more implicit modes of interaction such as eye gaze, gesture, and body position (Bezemer and Jewitt 2010).

3.1 Data collection

To analyze the influence of IT on conversational structure while assuring the comparability of observations, we acquire data from design experiments conducted in a realistic setting [29]. In a design science research project (Hevner et al. 2004), two IT-artifacts (cf. 3.1.2) were designed, implemented and evaluated with a major Swiss bank in 2014. The prototypes were developed in a user-centered interaction design approach so that the proposed solution reflects the requirements of the stakeholders – clients and advisors. We use state-of-the-art technologies including multi-touch input. However, we primarily focus on the conceptual design. The solution objective of these IT-artifacts was to support advisor and client in the needs elicitation during the financial advisory service. Evaluations of both artifacts were conducted according to the within-subject design so that we can compare the behavior of each client in the IT and pen-and-paper condition. The first prototype was evaluated with 36 potential clients and 12 experienced advisors over six days – 6 clients and 2 advisors per day. Each client participated in one traditional and one IT-supported advisory session. Each advisor conducted six advisory sessions per day. To counterbalance the effect of treatments order, we randomly assigned half of the clients and half of the advisors to start either with the conventional or with the IT-supported situation. The evaluation of the second prototype was conducted with two advisors and 8 participants. In both evaluations, a scenario was used as a starting point: in this scenario, the clients received a predefined amount of money that they want to invest (either by investing them in an investment portfolio or in a property). The customers were encouraged to provide their real data in other cases (e.g., hobbies, family, goals), so that they could identify with the ongoing conversation. We applied the same scheme in the pen-and-paper setting. The advisors, who participated in the experiment, have a long-term experience in frontline service at the bank. They were introduced to the tool before the experiment and received an extensive training session. In summary, we have analyzed 8 videos from each of the following conditions: (1) traditional advisory settings, (2) settings with the first prototype, and (3) settings with the second prototype.

3.1.1 Traditional advisory setting

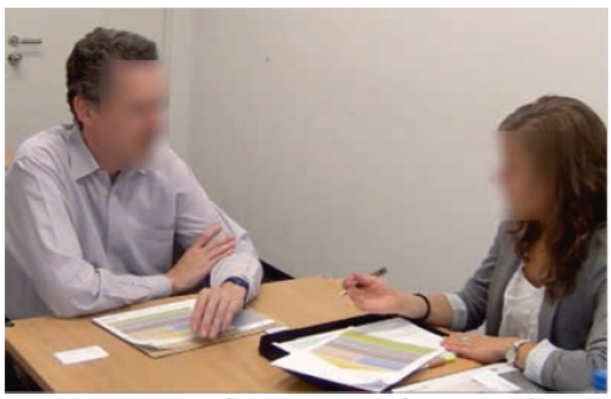


Figure 10 Traditional advisory setting: The advisor uses the "finance house" form and a notepad.

In the traditional advisory setting, advisor and client are sitting at a table (cf. Figure 10). She[2] uses an empty notepad or a predefined form provided by the bank. The form includes a picture of a house ("finance house") which is optimized for needs elicitation. Alike in the IT condition, the client uses his actual data and follows a spare scenario including financial details.

3.1.2 IT-Artifacts

In the IT-supported service encounters, a 27-inch multi-touch tablet (Lenovo Horizon) was used. The tablet was positioned such that both participants could view the content of the screen. The system was designed to support all activities conducted during a financial service encounter. Both IT-systems were developed in the same project. However, they differ with regard to the implemented metaphors and interaction principles:

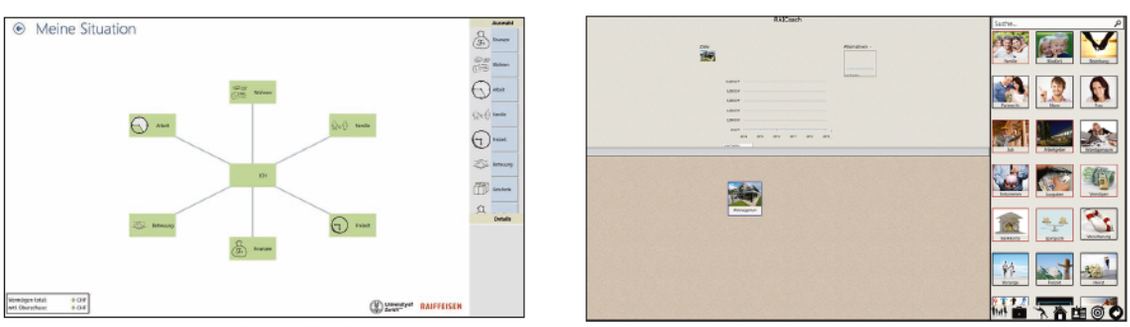


Figure 11 Left: needs elicitation screen of prototype 1. Right: main screen of prototype 2.

Prototype 1: The first prototype consists of three main screens: (1) Welcome screen. (2) Needs elicitation screen showing a mind map to insert the client's current situation data. (3) Solution finding screen showing the proposed solution and the finance plan to the client. The main design rationale was to provide an extensive support for the needs elicitation phase. The advisor and the client should jointly create a "picture" of the client's situation and needs. The interface provides a mind-map to support the information collection into an adaptive content structure. Computer supported mind-maps were applied in collaborative settings, where they intensified the information exchange between the participants (for the motivation of conceptual design regarding mind-map see (Buisine et al. 2007)). The inserted information was used to provide an immediate

[2] We refer to the advisor as a female and to the client as a male.

calculation of monthly surplus. The information was then transferred to the next screen for finding an adequate solution and visualized accordingly.

Prototype 2: This prototype has two screens: welcome screen and main screen that embraces spaces for needs elicitation and solution finding. The main design rationale of this prototype was to make a clear connection between the needs elicitation activities and the solution finding. As opposite to the first prototype, all functionalities are provided in one screen (Figure 11 right). The screen is divided in three parts. The top part includes on-the-fly visualizations of all solution-relevant information including calculations and prognosis of wealth. The bottom and right part are used for the needs elicitation. In the lower part (situation area), information items – in form of pictures - describe the client's situation. This solution does not impose any structure and follows the metaphor of an empty workspace.

The primary conceptual difference between the two prototypes regards the process of needs elicitation: prototype 1 imposes a structure (mind-map) while the other one does not. One can expect that such difference will impact the conversational structure: In the first prototype the given topics can impose fragmentation of client's turns when he talks about his situation. Conversely, the structure-free interface of the second prototype does not impose such constraints, such that the client is not tempted to interrupt the turns. The difference between the prototypes is reflected in the collected preference data. Whereas for the first prototype, the advisors reported to prefer the sessions with IT over the conventional pen-and-paper setting and most of the clients remained indifferent (Kilic et al. 2015), the second prototype was reported to be enjoyed by both parties as shown with satisfaction measures. Consequently, one would expect different effects of those prototypes on the communication during the service provision.

3.2 Data Analysis

A researcher under supervision of two other researchers analyzed the data in a multimodal fashion. He first segmented the videos into the phases of the advisory service: opening, needs elicitation, solution finding, and closure. In the first pass, he collected general observations on the character of the interaction, process, and attitude of participants, in particular, in the need elicitation phase. In the second pass, he identified specific episodes within the needs elicitation phase, characterized by unexpected behaviors of the customer or the advisor. In this step, he followed the overall principles of breakdown analysis (Urquijo et al. 1993), while applying the notion to the interaction between the advisor and the client. The episodes and at least two minutes preceding and following the identified "break-down" were fully transcribed in German. Also, other modes of interaction (eye gaze, gesture, actions on the tool) were annotated. Additionally, the researcher commented on pauses, subjective mood assessment, and visible problems and mishaps with particular focus on the behavior of the client. A second researcher has reviewed a portion of the original data and compared his observations with those of the main coder to assure the reliability of this qualitative study. All doubts were resolved in a discussion with the supervising researchers. Then, the identified and coded episodes were grouped according to the behavior of the advisor and the client. After comparing the classes of the episodes with the treatments, trends were identified by all three researchers. The common elements of the particular trends form the basis of this study – in the results section they are represented by a set of excerpts along with the transcription and comments.

4 Results

4.1 Traditional service encounter setting

We first report on the observations regarding the traditional setting supported only with pen and paper. For this study, we consider this situation as a baseline. Our analysis shows that there are repetitive patterns across the conventional advisory sessions, particularly during needs elicitation phase. We identified two main stages: (1) storytelling and (2) completion.

"*Storytelling*": After a short introduction and description of the goals and advisory process, the advisor initiates this stage by asking a general question about client's private and job situation and goals. The client explains his situation and provides a broad picture of his current status and his goals. In particular, he talks about his work situation, his income, assets, living costs and saving rate. The client, thus, dominates the situation. In this episode, the advisor only asks context relevant questions which refer to the data provided by the client. During "storytelling", the client talks significantly more than the advisor. The transitions between the topics during storytelling tend to be smooth. The stage goes to the end, when the client thinks he has provided enough information to receive an informed advice.

"*Completion*": After the storytelling stage, the advisor assesses whether the provided information is sufficient for the solution-finding phase. If not, she asks more questions to get the information. As opposite to storytelling, during completion the advisor clearly dominates the situation – she asks the questions, sets the prevalent topic, and assigns speaking turns to the client. The time-share of both participants is balanced. The transition between the topics within the completion stage tends to be incoherent. The advisor switches between topics according to the gaps. This stage goes to the end, when the advisor assumes that she has enough information to continue with solution finding.

Client talks even though advisor takes notes, especially in storytelling. There seem to be no problematic episodes: even though advisor does not maintain lot of eye contact with the client, the latter simply keeps talking and does not bother. Still, the whole situation seems quite natural to the advisor and to the client – we could not identify any breakdowns that would prove the opposite. Of course, there are some problematic issues in the pen-and-paper situation: the advisor needs to return to his notes from time to time to control whether they are complete or to remind himself of client's status. This may lead to, e.g., to the repetition of questions. After the needs elicitation phase, the advisor places her notes in between her and the client, so that the client can see it.

4.2 IT-sessions

At the beginning of the advisory session, the screen of the IT-artifact is black, so that the client and advisor focus on each other. After a short small talk and welcome conversation, the advisor introduces herself and gives a course of the advisory session. Next, the advisor launches the IT-artifact. Pointing on the screen, she explains the advisory model or services of the bank. Then she asks the client about his personal situation. In an ideal situation, while the client tells his story, the advisor would insert the client information on the respective screen (first prototype) or into the appropriate space (second prototype). As discussed later, this is mostly not the case, which is the motivation for this paper. After the needs elicitation phase, the advisor uses the IT system to prepare an offering of an appropriate solution. In this phase, the IT artifact is included into the collaboration as intended. The IT-artifact takes the role of a shared information space throughout the

whole session, so that the client always sees what is displayed on the screen and how the advisor interacts with the system. In the following part we will describe the interaction episodes, which we observed during data analysis. For each prototype, we show two examples of patterns that dominated in each treatment.

4.2.1 Prototype 1

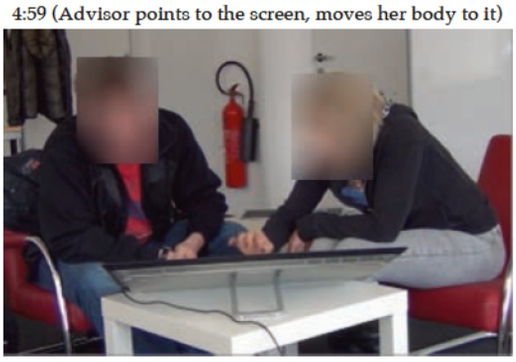
Example One: client talks and gets interrupted

4:25 (Advisor asks client about work situation)

4:28 C: I'm student and make 30 ECTS Points each term. In part time I'm judo trainer. Hobbies are judo and sport.... I'm living in Kloten, it's central, 10 minutes to the center.

(During storytelling advisor listens and asks no questions)

4:59 (Advisor points to the screen, moves her body to it)



5:10 (Advisor signals that she wants to fill in the information on the screen, again. Client talks further)

5:18 (Advisor interrupts the client)

5:18 A: I have to intervene before you talk all around through the topics. About the topic work. How much is your monthly income? How do you finance your living?

(Advisor starts asking questions from beginning and ignores already provided data)

5:28 C: I have a part time job and my parents…

(Advisor asks the client about the time invested in hobbies but does not look at the client)

The most characteristic feature of this episode is the explicit intervention of the advisor at the minute 5:18. This intervention follows a longer period, when the client seemingly ignores the fact, that the advisor turns her body towards the IT tool, looks at it, and moves her hand towards it, thus signaling that she would like to store the information provided by the client thereon. Thereafter, her questions reflect the topics provided by the interface and only sporadic refer to the information provided earlier by the customer. The advisor provides feedback in terms of short and sporadic nodding.

Example Two: client stops talking and waits

2:05 A: Can you tell me about yourself?

2:09 C: … I'm student. (*Advisor rotated to the screen*)

2:10 (*Advisor inserts information into system. Client watches and waits for the advisor to finish)*

2:20 A: How long is your duration of study?

2:21 C: About 1.5 - 2 years

(Advisor shortly looks up, than at the tool.)

2:23 *(Advisor makes an insertion into the system. Client watches the advisor.)*

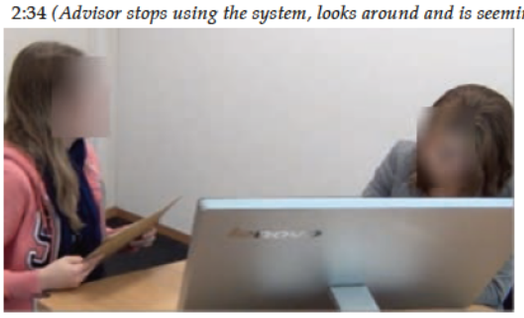
2:32 C: I also have a part time job.
2:37 A: To finance your study?
(Advisor inserts data. Clients stop and, looks at the tool.)
2:48 A: In which area do you work?
2:49 C: Informatics.
3:00-3:20 *Pause. (Advisor works with the IT-system; client watches his actions.)*
5:00 *(Advisor asks about financial situation)*
(Client speaks slowly and makes pauses when answering. Advisor interacts with system.)

The most characteristic feature of this episode is that the client stops talking after providing short information and noticing the intention of the advisor to bring the tool into the setting. From that moment onward, the dialogue has a question-answer character with a strong position of the tool. The conversation is fragmented and incoherent. Sequences related to a topic are rather short and encapsulated. The client speaks slowly and includes longer pauses. Overall, the client restricts himself to provision of appropriate data for filling out the input fields in the interface; consequently, his turns are short.

4.2.2 Prototype 2

Example Three: client talks and advisor gets lost

2:20 C: Currently I have rent a flat...
2:28 *(Advisor interacts with the IT. Client keeps talking).*
2:30 C: My goal in the next 5 years is to buy a house…
2:34 *(Advisor stops using the system, looks around and is seemingly disoriented.)*



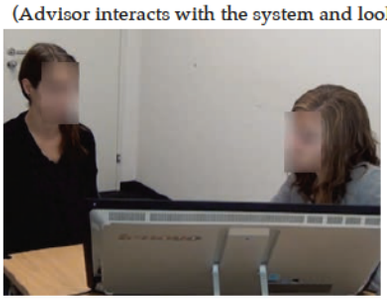
2:36 *(Advisor starts taking notes.)*
2:35 A: Hm, hm. (*Advisor uses semi-language*)
2:43 C: I already get money from my parents…
2:45 *(Advisor interacts with the screen per drag and drop)*
2:47 *(Advisor switches back to note taking)*
2:58 C: My monthly income …
3:02 *(Advisor interacts with the screen; client waits)*

The characteristic feature of this episode is observable at minute 2:30. Even though the advisor sends nonverbal signals and turns towards the tool, the customer does not stop make any pause. The advisor is visibly surprised. It is obvious, that the advisor has a hard time deciding whether to use the system for collecting the data or whether to take pen-and-paper notes while listening to the client's story. She decides to take notes and

reinforces this behavior throughout the whole needs elicitation phase. Later on, the advisor decides to transfer all the information into the system, which generates a longer phase where she is fully occupied with the IT.

Example Four: client stops talking and waits

2:15 (Advisor asks client about his personal and financial situation. Advisor moves her body towards the system, probably, to insert the information into it.)
2:30 C: I work at a travel office and live nearby. Hm.
2:37 (Client stops talking, looks around and watches the advisor interacting with the system.)
2:41 (Advisor notices the silence and asks a question.)
2:45 C: Yes (pause). These are (pause) 6500 francs each month. (Advisor works with the system in parallel.)
(Client waits until advisor is ready to take her input)
2:55 A: That is good.
2:56 C: I am living in a rented flat.
3:02 – 3:09 (Pause: Advisor inserts information about rent. Client watches advisor and waits.)
3:28 C: I have a savings account with 12 000 CHF. I am not saving regularly. I also have another bank account...
(Advisor interacts with the system and looks at the client. Permanently switching between system and client.)



Alike in example two, in this episode we observe a client who stops talking while waiting for the advisor who interacts with the tool. For instance, at minute 2:30 after providing little information about her current work situation, through usage of semi-language ("hm"), a pause, mimics, and looking up to the roof and then gazing at the advisor she signalizes that it is time for the advisor to take her turn. With time, a joint coordination behavior emerges: The client slows down and lets the advisor work with the tool. When the advisor notices that the client makes a pause or talks even more slowly, she looks up to her to encourage further storytelling.

4.3 Comparison of the interaction patterns

As discussed above, advisors signal their intention to use the tool during the client's storytelling mostly with eye gaze, gesture, and body movement. Interestingly, those signals are similar across all the cases and advisors. However, they cause non-deterministic reactions of the client. If we compare the both episodes reported for the first prototype, the following becomes obvious: In one situation the client after receiving this signals finishes his turn and lets the advisor insert the information into the tool. In the other case, however, he seems to ignore the fact that the advisor tries to point to the tool with her hand, gazes at the tool, and moves the body towards the shared artifact - he keeps speaking for another seconds until the advisor intervenes. Given that, in both situations, the client keeps eye contact with the advisor during his storytelling, and must have noticed the feedback, it surprises that they react differently and that those reactions have been observed across the data set. In the conventional treatment we mostly observe a consistent pattern for all clients: if the advisor starts to write on the paper, the client continues to talk with very short pauses (as opposite to example two), but does not stop his storytelling abruptly (as in example one).

These results are confirmed by the analysis of the episodes provided for the second prototype. Even though, in this situation another tool is introduced, we, again, observe the same patterns in client behavior as before. This is how clients react to the feedback showing that the advisor wants to bring the IT system into the process of needs elicitation: (1) The client finishes his turn and waits till the advisor completes her actions with the tool and asks a question (example four). (2) The client seems to ignore the signals received on the feedback channel and continues his story (example three). The fact, that the patterns can be observed across experiments with use of two tools with different designs confirms the prevalence of the findings reported in here. While for the first prototype, we used data produced with the participation of eight different advisors, in the second case we worked only with two advisors and, therefore, can assume that the signals they sent were more consistent. This fact even further supports our findings, as different reactions occurred as a response to the same signals from the advisor.

The behavior of the client at the particular moment described above has a strong influence on the remainder of the needs elicitation. As discussed with examples two and four, the established behavior keeps recurring – the advisor encourages the client to provide further data, but as soon as the client notices her will to insert the data into the tool, he slows down, finishes his turn, and waits for the next more obvious signal to provide more information. With time, in these examples the pattern settles down: the advisor provides less feedback, but tends to ask questions, and the customer makes more regular breaks, so that the advisor can maintain the tool. The coordination of conversation becomes a common effort. In example one, a similar pattern emerges with time, but not until the explicit intervention of the advisor – she obviously request the customer to coordinate his information provision with her actions, and so the conversation turns to a question and answer dialogue too. In example three, the advisor reacts differently – after a hesitation phase, she decides to disregard the tool during needs elicitation and falls back to the paper-and-pen note-taking like in conventional setting. However, as the IT provides her with clear advantage during solution finding (e.g., possibility to individualize the financial plan), she has to transfer all the information from the paper into the IT – this takes its time and makes the client wait for several minutes. Consequently, however the client reacts to the signals on the backchannel at the moment when advisor shows her will to attend to the tool, the consequences concern the whole needs elicitation.

5 Discussion

We identify the breakdowns on the feedback channel as an important cause of communication problems in IT-supported financial advisory services. Feedback channel problems negatively affect eye contact of the participants, conversational activity of the speaker, insecure behavior of the advisor, etc. When considering the data, one question that emerges from the analyzed episodes asks why the difference in the observed client behavior reaches so far? No obvious co-incidence with gender, age, or order of treatments in the experiments was found. Therefore, we propose an explanation of this variance while referring to the literature mentioned earlier.

As indicated by our observation, the client reacts to the same signals on the feedback channel differently. Those reactions are essential for handling the collaborative situations (Fischer et al. 2013). We argue that the variance in our data occurs primarily due to the assumptions that clients make about the meaning of those signals. Obviously the IT

changes the perception of the whole situation as compared to the conventional setting. Whereas the use of pen and paper are widely accepted in dyadic collaboration and may be considered part of the situational script (Oehler and Kohlert 2009), use of IT systems is still a strong intervention. The behavioral framework regarding co-located collaboration with a person that takes notes is well established – humans encounter such situations, e.g., in lectures and meetings. Use of collaborative technology is still quite limited and there are still no standards established for such settings – the client does not know how to interpret the feedback signals and makes random assumptions about the state of the advisor. In our opinion, these results from the fact that there are no or few known feedback signals for IT supported sessions and various interpretations are possible, alike in spontaneous non-institutional speech between unknown parties (Kraut et al. 1982; Harrigan 1985).

We claim, that in case of service encounter clients make constant assumptions about the interactional capacity of the advisor. In conventional setting, these assumptions rely on previous experience and situational script – the client knows that the advisor is able to write while he provides a lot of information in a single turn ("storytelling"). The IT usage captures additional interactional capacity of the advisor, but the client can hardly assess how much of it. Therefore, some clients assume that the advisor still has free capacities, and some others think he is fully occupied (Luff and Jirotka 1998).

The IT system, being a shared artifact of work, changes the way of how the participants use the feedback channel (Dix 1994). For a vivid and engaged interaction the clients must assume an attentive advisor and the attentiveness must be confirmed (Brennan et al. 2010). In the IT-supported situations the tool moderates the feedback channels between the advisor and the client: in particular, it limits access to such communication modes as eye gaze or gesture (when the tool is indeed used), however actions done with IT can themselves provide feedback. We argue that the latter does not transfer enough information about attentiveness of the advisor. The client is used to identify attentiveness based on eye gaze, nodding, and semi-language (Brennan et al. 2010; Fischer et al. 2013) and not from the state of the IT. Therefore the client needs to make assumptions about the attentiveness of the advisor in situations when the latter uses the system. We claim, that the feed-through mechanism (Dix 1994) is not enough for transferring the information about attentiveness in a quick and familiar way. Moreover, in the conventional setting, the advisor has more opportunities to provide feedback in a concurrent manner (while writing), while in the IT setting he tends to use eye gaze and nodding in a sequential manner (Dennis and Kinney 1998).

While the above motivates and explains the behavior of the customer in the particular episodes of the "storytelling" stage, below we want to take a more general perspective. Specifically, we investigate the coordination styles that the advisor and the customer adapt to coordinate their discourse. We identify two such styles: (1) In some situations the client and the advisor jointly establish a style of "common effort". (2) Sometimes the customer does not participate in the process of joint search for a coordination style – the advisor has to find a way to handle this situation alone, e.g., through usage of pen and paper instead of IT. In this situation, he bears the "burden" of micro-coordinating the conversation, as opposite to the first style, where the "burden" is shared.

We argue that such micro-coordination styles emerge throughout the discourse as a consequence of an implicit search for pleasant communication as proposed, among others, in the tuning-in metaphor (Gregory and Hoyt 1982; Tickle-Degnen and Rosenthal 1990; Ricard 1993). We claim, that the first style – "common effort" – as a way of coordinating

discourse between the advisor and the customer emerges as follows (based on examples two and four): At the beginning, the client talks about his situation while he notices that the advisor wants to insert the information into the tool. He needs to stop – this makes the communication unpleasant to him. The advisor, on the other side, cannot maintain eye contact with the customer, and she feels guilty that she interrupted the customer – this makes the communication unpleasant to her. Consequently, they jointly search for a behavior that will allow for a coordinated, and, eventually, more pleasant discourse and collaboration. However, since the client has to make pauses, this solution is not optimal either, but, given the data discussed earlier, it seems to be acceptable for both. However, the advisor, as in example one, can, also, enforce the "common effort" style. By interrupting the customer explicitly, she makes the communication unpleasant to him, so that both jointly establish a new way to micro-coordinate.

In the second case, the "advisor-only effort" (example three) style emerges as follows: At the beginning, the client tells his story and explains his situation. He ignores the feedback signals from the advisor and does not stop, when she wants to insert the data into the tool. For him this situation does not seem to be unpleasant. However, it is visibly unpleasant to the advisor – she is uncertain what to do and does not want to interrupt the customer. She falls back to a known solution. By doing so, she does not influence the state of the customer, and finds a solution that is also acceptable to her.

6 Conclusion and implications

In this paper, we present a study based on observational analysis of 24 recordings of financial advisory sessions with and without IT support. Our study shows interaction patterns of how the client responses to the conversational feedback from the advisor. Furthermore, it shows what coordination styles emerge after communication breakdowns caused by unusual feedback or not-expected reactions to this. As shown, the participants adapt their communication behavior based on the perceived responsiveness of the other – this holds in particular for the speaker in the goal-oriented collaborative setting, such as service encounters.

This study is not free of limitations. They are primarily related to the method applied – we decided to conduct realistic experiments. There is always a trade-off between the external and internal validity of a study – in this case, we valued the former more. At the same time, we wanted to assure for comparability between particular conversations and decided to control aspects that are not directly related to the course of the conversation: in particular, we kept the room, training, sitting position and dress code of the advisors similar across settings in a within-subject design, but did not intervene in how the advisor and client interact with each other. Importantly, our results relate to the usage of single display groupware and are limited to comparable service encounters.

Our findings imply, that it is necessary to refine the way in which IT is introduced into service encounters. In particular, the frontline personnel require a comprehensive training on how to maintain communication with the client, apart from the technical instruction on the tool usage. It shall prepare the personnel on different reactions that may occur during IT-supported encounters and to employ the feedback channel consciously. Also, the designers shall consider support for micro-coordination– they shall explicitly address established communication practices in addition to the overall work practices. This implies developing a system that allows for conventional style of micro-coordination during "storytelling", for instance, with use of technology for blending in the note-taking

behavior into an IT-supported setting with a seamless transition to the solution finding. We have access to very modern technologies such as tabletops, tablets, touch screens, etc., that are successfully applied in service encounters. However, this study reveals that those tools increase the complexity of micro-coordination in face-to-face settings. Therefore, we call for further design research in two directions: (1) development of service support systems based on available technologies to support the conventional behavior with regard to micro-coordination, (2) development of novel technologies that will enhance the micro-coordination in face-to-face encounters even above the conventional level.

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Part Two:

Understanding advisory practices

PAPER IV

Paper practices in institutional talk: how financial advisors impress their clients

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Abstract
Paper is a persistent element of financial advisory encounters, despite the increasing digitisation of the financial industry. We seek to understand the reasons behind the resilience of paper-based encounters and advisors' resistance to change by understanding the paper's roles in financial advisory encounters. While applying multimodal analysis to a set of field and experimental data, we point to a range of prevalent advisory practices that rely on the use of paper documents and hand-written notes. We focus on the choreography of paper and how this intersects with the participants' institutional identities and goals. Specifically, we show how advisors' paper-oriented actions seek to convey a positive impression about the advisor and about the bank to the client, i.e. how they engage in seemingly mundane practices to impress their clients. Paper is far more than a medium for saving and presenting information: it is an interaction resource, a semiotic resource and an institutional resource; all these aspects of paper come into play during a financial advisory encounter. The manuscript concludes with suggestions on the design of technologies that may potentially replace the paper in financial advisory encounters and assesses the likelihood of this in light of the results.

1 Introduction

The use of documents in advisory and service encounters is an all-round routine: medical personnel fill out paper forms during admission (Berg 1996), policemen take notes when recording a case (Sellen and Harper 2002), supervisors go through documents together with their students (Svinhufvud and Vehviläinen 2013), and financial advisors take notes and explain things by drawing on paper during financial advisory encounters. Despite the technological development and infusion of modern technologies into services, for instance through online service provision channels, face-to-face encounters have remained paper-based. The persistent presence of paper in the advisory encounters is not in itself a problem. On the contrary, we show how essential paper may be for the choreography of interactions during an encounter. However, post-crisis policies (EU 2014; CH 2015; DE 2016) oblige financial institutions to support their service encounters with digital tools: Choosing appropriate products, documenting the advisory process and outcome, and educating clients is increasingly less feasible via conventional tools such as brochures, paper and a pen. Further, the banks wish to use the information captured in advisory sessions for their marketing. Thus, numerous design and research projects have been launched to develop dedicated IT to support financial advisory encounters (Schwabe and Nussbaumer 2009; Heyman and Artman 2015; Kilic et al. 2015). Many studies propose replacing paper-based interactions with interactive IT-based elements. Nonetheless, such applications have had little commercial success, particularly in retail banking (Schwabe and Nussbaumer 2009; Heyman and Artman 2015). We argue that the reason for this lack of success includes the misunderstanding of the paper's roles in an advisory encounter: paper's functions go far beyond a medium for note-taking and the visualisation of information. While focusing on mortgage advisory encounters at a bank, we describe paper practices and illustrate how paper is used to establish and preserve a specific social order, to make impressions on a client, and to impose a structure in the cooperative, face-to-face interactions between advisor and advisee.

Understanding paper's roles in advisory encounters has practical and scientific potentials: Service designers approaching face-to-face service provision can derive design requirements for an envisioned solution while referring to observed practices. The managers responsible for face-to-face advice-giving may benefit from deeper knowledge about what happens during advisory encounters and the meanings of certain events. Design researchers pursuing a paperless office and a digitised workplace may gain insights into a challenging area that to date has escaped the pressure of digitisation and has survived in the highly computerised environment of financial institutions. Finally, scientists who use ethnographically inspired methods to study interpersonal interactions may find inspiration in our material-oriented approach, which roots in the multimodal and mediated perspectives (Scollon 2001; Kress 2009). Our results describe unfolding interactions in a specific institutional setting: a financial advisory encounter combines the monetary character of selling and the advisory character of counselling. Our study goes beyond existing institutional talk studies focused on instances with monetary, for-profit interests (Darr and Pinch 2013) or with a non-commercial character (Berg 1996; Sellen and Harper 2002; Svinhufvud and Vehviläinen 2013). Overall, we point to design issues as well as thought-provoking observations from a dynamic field.

We report on the results of a multimethod study designed to answer this research question: *Which paper practices do participants engage in during a financial advisory encounter?* We define a single practice as a type of routine or action that consists of an infinite number

of micro-behaviours, which participants engage in, but normally unreflectively (Scollon 2001; Nicolini 2012). A paper practice is a practice, an action or routine type, that relies on the use of paper, i.e. a blank sheet of paper, a hand-written note, a printout or a document. A practice may involve more than a single sheet of paper, and may refer to this sheet as a holistic object or to its content. To identify various paper practice types and to comprehensively describe them, we launched a fieldwork study using ethnomethodologically inspired interview and observation methods in a workplace environment (Luff et al. 2000) supported by multimodal analysis of previously collected video and workshop data. We will summarise and discuss the results.

2 Related work

2.1 Financial service encounters as institutional talk

Financial service encounters form a specific advisory encounter type, i.e. transactional interactions in which an advisor provides an advisee with advice regarding a service or a product (Jungermann and Fischer 2005). In financial service encounters, the advisor is normally a designated bank clerk who is trained to provide advice on the products offered by her[3] employer. The advisee may be a current or a prospective client of the bank who is searching for an appropriate financial product (e.g. a mortgage) (Oehler and Kohlert 2009). Financial service encounters have received attention from a descriptive and analytical perspective (Verhallen et al. 1997), a prescriptive perspective (Moulton 2011; Bradbury et al. 2015) and a design perspective (Heinrich et al. 2014b; Heyman and Artman 2015). The research provides a well-motivated and founded yet global and general picture of financial service encounters. Particularly, the research oriented to interactional micro-behaviours of the involved parties is very limited (Kilic et al. 2016), besides the fact that many studies generally agree on the crucial role of interpersonal communication on advisor and advisee satisfaction with a service encounter (Apte and Vepsäläinen 1993; Schwabe and Nussbaumer 2009; Dolata and Schwabe 2017a). We seek to deepen the understanding of advisory encounters while pointing to a set of characteristic micro-behaviours that involve the use of paper in the interaction.

Most advisory encounters, including financial service encounters, are key examples of institutional talk. In contrast to spontaneous and private dialogue, institutional talk involves participants whose goals are tied to their institutional identities (provider vs. beneficiary), occurs in a predefined context according to a presumed scenario, which in turn constrains the allowable contributions to the interaction (Drew and Heritage 1992b). For instance, an encounter between a doctor and a patient happens mostly in a hospital or at a local surgery and follows a scenario of a medical examination in which the patient contributes the description of his or her complaints, and the doctor contributes treatment suggestions. Similarly, in a mortgage advisory service, the client's contributions would include information on his or her monthly income and savings, a property or properties they would like to buy and likely plans for the future, while the advisor's contributions would include an assessment of creditworthiness or information on the configuration of a possible mortgage (Verhallen et al. 1997). In other words, while in a transactional encounter the participants exhibit asymmetries regarding access to virtual or material goods, the participants in an advisory encounter exhibit knowledge differences about the

[3] For a simple gender balance and for the clarity of the argument, we refer to the financial advisor as a female (*she*, *her*) and to the advisee (client) as a male (*he*, *his*).

process and the content (Ten Have 1991): First, the advisor has knowledge about the actions sequence in the encounter, while the advisee can only assume a process using his or her previous experience and general knowledge. Second, the advisor has knowledge on the solution domain, and the advisee has knowledge on the problem domain. During an advisory encounter, the advisor and the advisee engage in interactive problem-solving to reduce these asymmetries jointly and cooperatively (Dolata and Schwabe 2017a). The study of asymmetry in institutional encounters (Adelswärd et al. 1987; Itakura 2001; Dolata and Schwabe 2016) confirms that the provider dominates the situation in terms of interactional resources: Based on the analysis of the verbal conduct (amount of words, amount of time, content), the studies note that providers have interactional dominance in and responsibility for turn distribution, time allocation and conversation focus (Itakura 2001). While some studies consider non-speech characteristics such as gestures (Heath and Luff 2011; Mondada 2013) or the manipulation of objects (Hazel and Mortensen 2014; Mondada and Svinhufvud 2016), they only marginally address the features of institutional talk, and do not systematically discuss how material conduct reflects asymmetry and dominance in institutional talk. Instead, they offer punctual, localised descriptions that at most let us assume that observing materials use may characterise dominance during the encounter. For instance, a provider who points at an item in a form does it to inform the beneficiary about the intention to move the discussion to a specific point (Mikkola and Lehtinen 2014), or the provider who browses through a pile of files gives the beneficiary the feeling that he is one case among many (Svinhufvud and Vehviläinen 2013). While these studies have made first steps towards multimodal and mediated analysis of conduct in institutional encounters (Scollon 2001; LeVine and Scollon 2004; Kress 2009; Mortensen 2012), we seek to shed more light on material conduct in institutional talk, especially on the dominance relationship.

Institutional talk includes many encounter types: some focus on a transaction and others on counselling, some are short and others long, some are one-time meetings while others are a single episode in a longer relationship. Multiple studies approach these differences while following an ethnomethodologically informed method set (including *ethnomethodologically informed conversation analysis*; EMCA) (Sacks et al. 1974; Goodwin and Heritage 1990; Heritage 2005). Most studies in this realm focus on non-commercial voluntary encounters with doctors or teachers (Mondada 2013; Svinhufvud and Vehviläinen 2013; Svinhufvud 2016) – following Sacks et al. (1974). However, some studies address transactional encounters as instances of institutional talk – they have analysed interactions at flea markets (Clark and Pinch 1986; Pinch and Clark 1986), in stores (Darr and Pinch 2013) and in trade shows (Wooffitt et al. 2013; Darr and Pinch 2013), where the act of selling is of primary importance. Through the analysis of speech and gestures, they identified mechanisms used by sales personnel to intensify customers' obligation to buy, and propose theatre as an applicable metaphor to explain the interactional conduct between sellers and buyers (Darr and Pinch 2013). They have also called for intensive research into the material organisation of transactional encounters (Darr and Pinch 2013). We seek to answer this call, focusing on a specific institutional encounter type, financial service encounters, which have always combined elements of selling and counselling, and are currently evolving towards interactive problem-solving encounters (Jungermann 1999; Dolata and Schwabe 2017a), thus becoming cooperative; yet, both participants in such an encounter have monetary incentives, i.e. selling or getting a target product at the best price. We argue that exactly this combination between selling and counselling drives the material conduct during a financial advisory encounter: Sheets

of paper are used to reduce the knowledge asymmetry between the participants; they are used in ways that support the selling or buying of a product. How this tension is reflected in the material conduct between the advisor and the advisee remains an open question.

2.2 Paper – between affordance and practice

Studies of material conduct at work – be it in distributed, simultaneous or collocated collaboration – often come down to paper as the central material element in the workplace (Sellen and Harper 2002; Luff et al. 2009; Svinhufvud and Vehviläinen 2013). Despite methodological or domain-related differences, most studies adhere to one of the following perspectives (albeit not always explicitly): they either analysed the practices established with use of paper or the affordances of paper. In other words, they either assume the priority of practice as the nexus of interaction in social, organisational, cultural or situational contexts, or they give priority to material and its affordances as a source of interactional conduct (Fayard and Weeks 2014). Fayard and Weeks (2014) provide an extensive theoretical discussion of the tension between these two directions and how they complement each other. We use both the practice and affordance perspectives to discuss paper's roles in interaction: *How do specific practices shape the roles of and attach meaning to paper? How do specific affordances of paper enable or favour specific practices?*

The notion of paper and the notion of its affordances are interconnected: paper is defined by the actions it affords, and explanations of *affordance* often use the example of a sheet of paper (McLuhan et al. 1967; Sellen and Harper 2002; O'Neill 2008). Based on Gibson's (2015) ecological approach, Norman (1988) adapted *affordance* to the field of human computer interaction (HCI). The term has since been widely adopted and re-interpreted, leading to a dilution of its meaning (Norman 1999). We use a definition shared across the literature on paper that relates affordance to objects' properties that determine the possibilities for action (Sellen and Harper 2002), described as facts about action and interaction (Gaver 1996). This notion of affordance is not limited to a singular object or a single user – a set of objects that form an environment can afford specific (inter)actions. In this sense, the theory of affordance offers a perspective on how the construction of objects shapes and patterns practices (Fayard and Weeks 2014).

When considering paper's affordances, the research lists and discusses technical, mechanical or visual characteristics of paper that afford particular interaction types (Gaver 1996; Sellen and Harper 2002; Piper and Hollan 2009). Sellen and Harper (2002) present affordances of paper for reading, document-filing and micro-management. They compare which actions (e.g. in an air traffic control centre or at a police department) are afforded by paper and by IT in order to make suggestions on the improvement of IT – paper affords among others easy navigation through documents, reading across many documents, marking up a document while reading, interweaving reading and writing, controlling access to a single document, and joint viewing. While Sellen and Harper have provided deep insights into work conduct in chosen settings, they focused on back office activities and, even in the police department case, they reported only briefly on paper's use in conversations between police staff and witnesses, in which police staff used paper simply as a notepad.

Gaver (1996) took another approach to describe paper's affordances: he discussed the choices people make in their daily work between paper and dominating technologies (from 1996, e.g. electronic mail). Based on deductive argumentation, he described paper's affordances in such areas as input (e.g. greater flexibility of input on paper owing to a

variety of input tools), visibility and physicality. Gaver points to the integration of data storage and display that is a characteristic of paper – in his view, paper affords higher predictability: by simply looking at a pile of paper, people can estimate how much content is stored there; by spreading several sheets of paper across a table, people can easily predict a document's internal structure; however, owing to the display-storage integration, users cannot change the content of a sheet of paper without changing its visual appeal. Gaver does not discuss the fact that, depending on the context, the paper's affordances may differ – predicting the internal structure of a book does not rely on spreading its pages on the table. Thus, while we accept Gaver's (1996) account of paper having a set of fundamental features, we don't follow his physical approach to paper. Owing to their physical emphasis, most affordance-oriented studies overlook the discussion on how paper's affordances may reinforce or undermine the features imposed by the context, i.e. they provide limited accounts of how paper may support or impair the role distribution or general character of institutional talk. Recent changes in ecological psychology have opened a discussion of the relationships between a user's background and routines and affordances (Leonardi 2011; Fayard and Weeks 2014) (Leonardi, 2011; Fayard and Weeks, 2014): *Which affordances work in practice, 'in the wild'? How should we design artefacts for specific practices to emerge?*

Other studies that seek to understand paper's practical roles rely on the notion of *practice*. Like affordance, practice has attracted much attention across the boundaries of scientific and professional communities (Nicolini 2012; Kuutti and Bannon 2014), leading to a variety of perspectives and framings (Wulf et al. 2011; Shove et al. 2012; Nicolini 2012). We follow a specific notion of practice that originates in work on mediated discourse (Scollon 2001; LeVine and Scollon 2004), multimodality (Kress 2009) and multimodal conversation analysis (Mortensen 2012). Following assumptions that are common to these sources, we see mediated action as an appropriate unit of analysis for understanding paper practices. Actions are grounded in objects and persons in time and space, and are situated, real-time, irreversible and unique (Scollon 2001). At the same time, actions also depend on their contexts (Scollon 2001); thus, an encounter's institutional character clearly and strongly influences the allowable and de facto occurring actions (Hazel and Mortensen 2014). A material object, such as a sheet of paper, is a semiotic mediational resource – it generates and transfers meaning when used in a specific action (Kress 2009). Further, it provides interaction partners with its constraints and affordances, and it is intertextual and interdiscursive, i.e. the meaning it generates or transfers intersects with the paper's meaning in other actions (Scollon 2001; Kress 2009). *Practices* define this milieu of actions: they describe the action types that humans directly and repeatedly engage in, but normally do not attend to them in analytical, conscious ways (Scollon 2001; Mortensen 2012; Nicolini 2012). This notion of practices shares much with the view of practice proposed in computer supported cooperative work (CSCW) research: practice as a routinised human action, the smallest unit of analysis in social phenomena, patterns of action that encompass mental, physical, material and object-oriented activities (Schmidt 2011; Wulf et al. 2011; Shove et al. 2012). Importantly, this take on practices stresses their dependence on the use of tools and media and the fact that practices are collective interaction patents that are instantiated in single, contextualised actions that may vary across situations (Wulf et al. 2011). Schmidt (2011) argues that the study of practices is transformative: through redesigns of tools and materials, one can make users engage in specific actions and can therefore expect changes in actions patterns (Wulf et al. 2011). CSCW uses the notion of practice to describe a person's interaction with a technology in

a social or work context with the goal of rationalising and transforming existing practices via IT. We approach *paper practices*, i.e. we describe the meanings of sheets of paper in a prototypical advisory encounter and observe how this intersects with other practices (e.g. conversational or organisational ones) and with an individual's accumulated experience of practices. The identified practices are also the starting point to identify potential for IT as an instrument for collaboration support and practice transformation.

The research stream that studies paper practices while looking at situated action has brought insights into paper documents' roles in many specific areas. Weilenmann and Lymer (2014), who looked at how paper documents drive the work of television journalists, point to the difference between incidental and essential uses of paper: while some activities only imply the use of paper, others are built around a paper document (e.g. to move a Post-it from one table to another means transferring the responsibility for the task thereon). In medicine, studies on paper practices (Heath and Luff 1996; Berg 1996; Jones 2009) stress the fact that paper forms dominate the conversation between medical staff and patients and are thus an origin of specific practices: the studies show how a sheet of paper, through its content, form and presence dominates and drives practices (Heath and Luff 1996; Jones 2009). Further studies approach paper practices in such settings as student supervision encounters (Svinhufvud and Vehviläinen 2013; Mondada and Svinhufvud 2016), appraisal interviews (Mikkola and Lehtinen 2014), debates on democracy (Mondada 2013), copy shop purchases (Moore et al. 2010) and underground control centres (Heath and Luff 1992). Many of these studies (Svinhufvud and Vehviläinen 2013; Mikkola and Lehtinen 2014; Weilenmann and Lymer 2014; Mondada and Svinhufvud 2016) point to the dual nature of paper practices. They differentiate between practices that rely on the material nature of paper and those oriented to a paper's contents (Weilenmann and Lymer 2014). To use paper as a material object is to emphasise its physical nature – it involves moving paper in space, folding it, pointing at it, etc. (e.g. Mondada 2013). To use paper as a textual resource means to focus on its content – be it a text, a multimodal content or, in specific situations, a paper's form; for instance, paper's textual nature is essential during collaborative reading or writing (e.g. Mondada and Svinhufvud 2016). The study of practices points to a key feature of paper – its dual nature; it also makes clear that paper's features come to play at different intensities depending on the context. Regarding institutional talk, results remain indecisive: while some studies stress the importance of material practices (Svinhufvud and Vehviläinen 2013; Hazel and Mortensen 2014), others point to paper documents' contents as the driving element (Heath and Luff 1996; Jones 2009; Weilenmann and Lymer 2014).

While the affordances view of paper makes clear how paper's physical features are reflected in the ways it is used, the practices perspective points to how paper's different qualities come together in particular actions and how these actions are shaped by paper's features. Paper's affordances allow for a range of hypothetical action possibilities, including information sorting, storing and transfer. The study of specific practices illustrates how these possibilities turn into real actions: turning over a sheet of paper leads to topic shifts, and forwarding a piece of paper transfers responsibilities. Further, the study of practices show how paper's features and contents constrain actions, while inducing a specific order of interaction, enforcing or reinforcing practices it was thought to support. Thus, to understand paper's roles in financial advisory encounters, the practices perspective seems particularly appropriate. We build on identified practices as well as the reasons behind them to discuss whether IT can adequately support and constrain interactions between a client and an advisor.

2.3 Designing for financial advisory encounters

The financial industry is undergoing radical changes owing to digitisation, which increases the pressure on the financial advisory encounters. Fintech startups develop business models that undermine traditional, face-to-face advisory services, including via robo-advice (Arwas and Soleil 2016; Zavolokina et al. 2016a, b). Regulators expect banks to guarantee clients' understandings of content; this goes beyond the traditional signature below the fine-print (EU 2014; CH 2015; DE 2016). Finally, banks' managers are seeking to streamline, standardise and make advisory encounters more attractive, in order to stand out from competitors (Schwabe and Nussbaumer 2009). Overall, the financial institutions are increasingly examining opportunities to enhance, redesign or replace advisory services, thereby attracting the attention of IS and CSCW/HCI design researchers.

Nearly all research that designs for advisory services, specifically financial advisory services, seems to have an implicit, unspoken assumption: *paper is part of the problem*. Thus, researchers propose designs that involve reality-based interaction and attraction tools (Jacob et al. 2008): widgets and interaction areas replace pieces of paper; flexible and interactive graphics replace brochures and drawings; touch and other natural input methods replace pens (Heinrich et al. 2014a; Giesbrecht et al. 2015; Heyman and Artman 2015; Kilic et al. 2015; Comes and Schwabe 2016a). Simultaneously, new devices with various formats are appearing and are adding additional features: tablet computers enable the capturing of pictures during mobile advisory encounters (Maetje 2014; Giesbrecht et al. 2015); multi-user table-top displays are entering the stationary scenario while making the data persistent and data transfer more effective (Nussbaumer et al. 2012; Heinrich et al. 2014b; Heyman and Artman 2015); finally, recent improvements in augmented reality, for instance, in health (Butt and Navarro 2016) or library services (Meredith 2015), lead us to expect financial services to become dependent on augmented technologies, including paper-augmented systems (Luff et al. 2007). Besides technical improvements, systems designed for financial advisory encounters also claim to establish new interaction principles: spaces to support shared understandings and transparency (Nussbaumer et al. 2012), experiential learning to enable informed client decision-making (Heinrich et al. 2014b), and joint profiling to stimulate client data exchange and to ensure individualised offerings (Kilic et al. 2017). Overall, the studies address the declared goals of financial institutions, advisors and regulators. And, while doing so, they are moving away from paper. Despite the successes of the above solutions in experiments, their proliferation in real financial services has remained limited (Schwabe and Nussbaumer 2009; Kilic et al. 2017). We argue that, among others, the elimination of paper practices has lowered their popularity. Thus, it is apt to study existing practices in advisory encounters.

2.4 Designing for paper-like interactions

While paper practices in service encounters have remained underexplored, CSCW has researched and supported paper practices in many other contexts. Research into collaborative writing and drawing has sought to make IT enable paper practices since the 1990s (Ishii and Kobayashi 1992; McGee et al. 2000). These design efforts have augmented paper-based work practices, for instance, processing maps in an army command post via IT by enabling drawing or writing on digital copies of documents (McGee et al. 2000). While they have used practices as a source of inspiration, they don't consider the meanings of practices; instead, they have provided technological workarounds to imitate

paper practices (McGee et al. 2000). Numerous similar studies continued to push for more paper-based interfaces in such domains as design (De Sá et al. 2009), control rooms (Butscher et al. 2013) or engineering education (Salvador et al. 2014). They have contributed principles and ideas that make IT support acknowledged practices that, to date, have depended on paper. However, they seldom discuss what these practices mean and how they intersect with paper's characteristics. Also, they don't question the observed practices and their necessity in given contexts. Thus, they have left many questions unanswered: *What does it mean when someone puts a Post-it on a blackboard? And what does this mean during brainstorming as opposed to work in a control room?*

Another research stream into paper-based interfaces has taken an affordances-oriented approach (Luff et al. 1992, 2007, 2009; Pyykkönen et al. 2013). Such studies change the affordances of digital technology to mimic paper or extend paper's affordances to provide functionalities of digital technologies (Luff et al. 2007). However, they primarily consider simple usage scenarios and tasks (e.g. changing slides) (Luff et al. 2009). The augmentation of paper with digital technology still lacks real usage cases: Digital pen technologies that use special paper or infrared positioning, which have available for more than 15 years, remain niche products used almost solely for note-taking. Writing on touch-sensitive displays and tablets, which have been available for more than 20 years, became mainstream only two years ago, after the launch of new iPad and Surface devices. Finally, the use of a large table or table-top display in combination with a paper-based working environment remains an object of research. We argue that a lack of understanding of paper practices hinders the popularisation of these innovations. We seek to deepen the understanding of paper in institutional talk and discuss the potential of paper augmentation, considering the identified practices.

3 Methodology

Given the lack of understanding of paper practices in financial advisory encounters, we leverage multiple techniques to better understand paper's value and roles. We focus on the uses of paper in situated actions and in interactional and organisational contexts. We built our study around several data sources that both give access to interactions in a real context and provide the possibility to zoom in on interactional conduct including singular micro-behaviours. We use two data sources as described in the remainder of this chapter: 1) primary data – observational data from de facto financial service encounters collected in fieldwork and analysed in accordance with ethno-methodological standards for workplace observations (Luff et al. 2000), 2) supporting data – recordings from financial advisory encounter experiments analysed in accordance with multimodal discourse analysis. Further, our study would not be possible without our background knowledge of financial encounters and financial institutions collected in a decade of research (much of which has been published) (Schwabe and Nussbaumer 2009; Heinrich et al. 2014a; Kilic et al. 2015; Dolata and Schwabe 2017a). Importantly, we confirmed all observations in the main data by systematically analysing the supporting data. We collected the primary and supporting data during a project with a regional, mid-size Swiss bank we call MoBa (Mortgage + Bank). MoBa focuses on the provision of mortgage contracts to retail clients, which includes individuals, families and small businesses, as well as finances purchases of new properties or the renovation of old properties. Mortgage advisory encounters are particularly important to our study. MoBa, the University of Zurich and a Swiss university of applied sciences started a joint project to

develop a software to support advisory encounters. The authors of the current study (University of Zurich) analysed the status quo of the advisory encounter and for the evaluated the prototypes designed by the partners. The project lasts until late 2018: the final system is now under construction after a phase of user-centred design.

3.1 Primary data and analysis

Observations of de facto advisory sessions collected during fieldwork form our primary data source. We made the observations during financial advisory services conducted with real customers and real advisors involved in de facto mortgage advisory encounters, i.e. ones that lead to a serious offering from the bank and potential monetary consequences for both customers and the bank. In contrast to an experimental setting, where these consequences are simply projected (i.e. imagined) into the future and the interaction is done as if it were real, fieldwork allows for observations of de facto emotions and practices. While in the observed encounters, an advisor may be driven by the goal to make a deal, and the client to negotiate the best conditions, these are not the only drivers: Clients often chose MoBa because they wanted to support local business or because they have been MoBa clients for generations. Advisors often stress the fact that they want to find a compromise between the bank and the client in a transparent manner, and they consider themselves a part of local communities, which makes them mutually dependent on their clients. Thus, the clients and the advisors tend to engage in collaborative service encounters rather than simple transactions as in most retail scenarios. By observing real practices embedded in interactional and institutional roles and contexts, we seek to capture the complex nature of financial service encounters, which is crucial to understanding paper's roles therein.

Compared to experiments or simulations used in other studies (Heinrich et al. 2014b; Kilic et al. 2016, 2017), data collected in fieldwork provides insights that are unaltered by the extensive control. However, data collection in a sensitive area such as financial advice remains a problem: specifically, access to real advisory sessions and their recording remain a challenge. Generally, banks and advisors do not agree to video or audio recordings of advisory sessions or client interviews, for two reasons: the confidentiality of clients' financial data and the natural character of the interaction, which may be disturbed by the presence of a camera or a voice recorder. Thus, we made concessions regarding data collection and adjusted our ethnomethodologically inspired workplace study (Luff et al. 2000): we limited our data collection to note-taking. Nonetheless, we could make up for these compromises by collecting extensive video material and interview recordings in the supporting data.

Learning about advisors' routines inside and outside the advisory sessions was crucial early on, to understand what drives the advisors in their normal workday and to see what role advising has therein (besides advising the clients, advisors also have administrative tasks, for instance, informing clients about the progress of their mortgage applications). The project partners agreed to conducting contextual inquiries with the bank advisors and to shadowing them throughout their days. Throughout eight full, non-consecutive days (70 hours on-site), we could observe five advisors from various branches of the bank conducting nine mortgage advisory sessions with various clients. We collected the data between October 2015 and March 2016 in the form of chronological notes. Figure 12 shows example pages from the notes. Each day started with a short interview on what the advisor is currently pursuing and their general goals for the day. Finally, every day finished with an extended interview that focused on the observations made during that

day; our focus was to understand the observed practices. In summary, fieldwork resulted in a set of notes and information collected during the interviews.

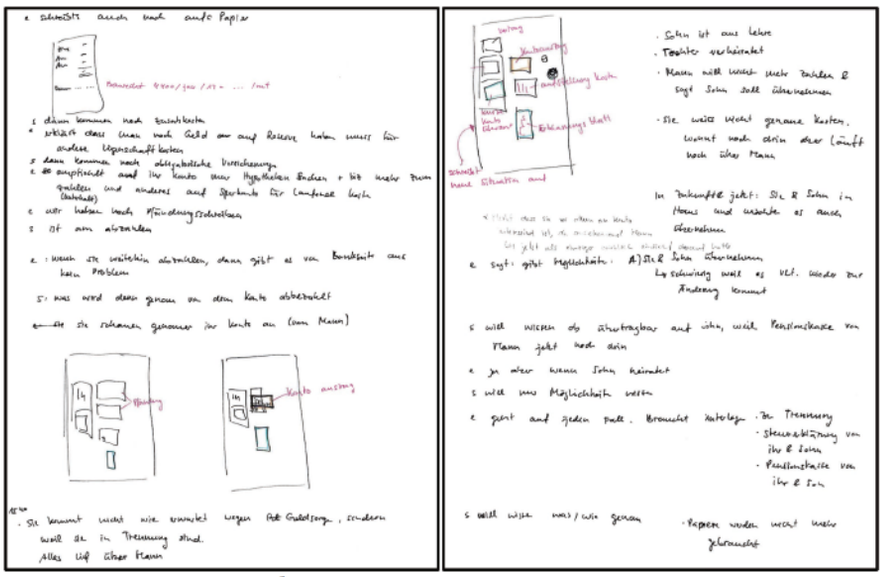


Figure 12 Two example pages from the fieldwork notes, including observations from a financial advisory encounter at MoBa.

The data collection and analysis were designed to yield a description of what happens during an advisory session. This description would provide material for the discussion of a social and interactional order, as evidenced in the use of *oriented objects*, i.e. objects that become relevant to the unfolding interaction through orientation, gestures, posture and verbal communication (Garfinkel and Rawls 2002). During the analysis, we focused on the identification of relevant objects: 1) we indexed the objects mentioned in the notes and 2) identified passages in the interviews that refer to these objects; we then 3) reconstructed the behaviours involving these objects based on the notes and the advisor's explanations. We grouped the instances based on the similarity of the actions to provide a consistent and conclusive description of action types. We present these in the results section as practices and provide a rolling example based on the collected notes that illustrate the given practice (in the grey background). Then, in the discussion section, we go beyond the local, interactional sense of order (e.g. changing between tasks) and interpret the identified practices, considering the higher-level social order imposed by the institutional setting and the characteristics of paper. Thus, one can see the provided results as an adequate description and summary of the observed practices.

3.2 Supporting data and analysis

To enhance the study's reliability, we included a further data set into the current analysis. This extends the main data as follows: 1) it gives access to additional instances of advisory encounters and 2) it enables step-by-step analyses of the unfolding interaction – including mimics, low-level gesticulation and verbal activities. While the primary data offers insights into de facto advisory sessions, enhancing external validity, the collected material consists of notes that might be imprecise regarding the turn-by-turn interaction. To balance out this effect, we decided to include further data for exact sequence and structure analyses: the supporting data includes 24 videos of conventional advisory sessions collected in a design experiment (Mettler et al. 2014) – the controlled setting does not provide a fieldwork's external validity, but allows for multimodal coding and fine-tuned

observations. We conducted the design experiment to test an early instance of a system developed in a joint project between the MoBa and the University of Zurich: the goal was to compare IT-supported advisory encounters against those conducted in a conventional manner – via the use of paper, pens and bank printouts and without use of IT, i.e. following a normal MoBa advisory process and setting. Each advisory session was done by a MoBa bank advisor to a test person acting as a client. Every client attended to a conventional and an IT-supported advice in a randomised order. We recorded all sessions by means of audio and video. The six advisors in the experiment provided eight advisory encounters each, i.e. 48 overall, but only half of them (no IT usage) are relevant to the study (we are researching existing practices, not IT-induced ones). After participating in two advisory sessions, we asked all participants to fill out a questionnaire and to participate in an interview that focused on the differences between the two encounter types. We conducted the experiments in July 2015 and analysed them in early 2016. In our analysis, we adhered to the standards of secondary data analysis for design research (Dolata et al. 2015) – we leveraged a portion of data collected during an evaluation experiment in a way that neither interfered with the study's original goal, nor ignored the original study design. Only one advisor from the experiment was later chosen for the fieldwork study (see the primary data). This further supports the study's reliability, while stressing the fact that the identified practices are neither person-specific nor related to a specific MoBa branch or setting.

We designed the video analysis to identify the paper-dependent routines advisors use during encounters. The analysis uses the methodological grounding for multimodal discourse analysis (Scollon 2001; LeVine and Scollon 2004; Kress 2009): First, the researcher identified episodes where paper and other material were used – all interactions with paper (such as pointing at it, touching or moving it) were considered, resulted in more than 2,100 distinct episodes marked with the multimodal coding software ELAN (Brugman and Russel 2004). Second, the researcher annotated the identified episodes with advisor actions, client behaviours, prior and subsequent events, and a general description of the episode. Third, the researcher clustered the identified episodes based on the similarities in the above dimensions, leading to 22 distinct clusters. After a consolidation of clusters with insignificant or negligible differences (e.g. moving a printout vs. moving a page with own notes), this analysis provided 12 action types. After consolidation, the supporting analysis did not point to any new practice beyond the ones observed during in vivo observations. Thus, the supporting data contributed to the results, i.e. to the descriptions of all practices listed therein.

4 Results

To provide a comprehensive view of the material organisation of a financial advisory encounter, we focused on describing the steps involved in a set of most popular distinct practices. Inspired by the tradition of EMCA (Goodwin and Heritage 1990) and multimodal analysis (Scollon 2001; Kress 2009), we provide a chronological, turn-by-turn description of the unfolding interaction. While the EMCA defines a *turn* as an atomic utterance of a participant, we define it as a physical action, a minimal set of gestures, including moving, holding pointing at or writing on a sheet of paper. To give the reader access to the observations, we provide a set of pictures, each of which represents an atomic practice. The simplistic nature of the bird's eye view sketches enhances the focus on the interaction's paper-based choreography. We explain the depicted interaction and refer to

some relevant comments from the interviews. The orange elements represent movement of the paper across the table; the movement direction is indicated by an arrow. The short dialogues on grey background constitute a rolling example that illustrates the described practices and are a combination of fieldwork notes and passages from the supporting data. Codes in square brackets (e.g. [STH]) point to specific advisors and let the reader understand whether quotes belong to the same person or a different person. Overall, the results form a comprehensive description of a financial advisory encounter from start to finish. Thus, the reader gets easy access to the results, which allows for individual interpretation.

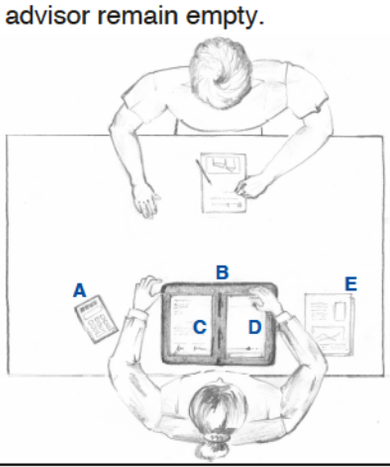
4.1 Practice: Organising

We join the participants at the start of the advisory encounter. The advisor and the client shake hands and enter the room, the advisor behind the client. The room is empty except for a table with chairs around it. On the table, there is a black leather file folder; the advisor put it there just before the session. The client takes the other seat, opposite the one with the black leather folder. They start with small talk while the client takes some files and puts them in front of him and the advisor opens the folder and puts her calculator on the left and a portion of the documents on the right. They continue their small talk.

Illustration	Example

Unfolding the interaction space

At the start of the advisory encounter, the advisor organises her side of the table: she distributes the documents and the calculator along her side of the table. Importantly, as explained by an advisor, the piles of paper are not randomly ordered or put together: "It is necessary to know what is in each pile so as to look confident and professional. The order reflects my plan for the encounter" [STH]. The calculator (A) goes from the leather folder (B) to one side, a pile of bank documents (E) to the other side, a pile of the client's documents (e.g. the email with the appointment or account data) (C) remains in the folder next to the pen and the pile of blank sheets of paper (D). The advisor's papers take up a third of the table. The space between the client's documents and the space reserved by the advisor remain empty.



A: Hello. Welcome to MoBa, Mr. Butterfly. I know you were talking to Ms. Ladybird some months ago. She is on maternal leave, and I will substitute for her. I hope you're okay with this.

C: No problem.

A briefly looks at his notes on the left (C).

A: And, yes, in your email, you said that you inherited a house from your father few months ago.

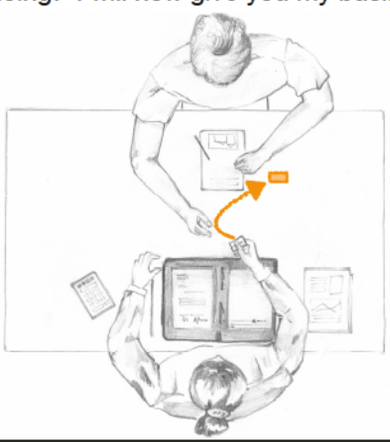
C: Exactly, yes, well…

A: Thank you very much for all the material you've sent me per email. (…)

Presenting oneself

Often, the first activity that participants engage in at the table is a short presentation. The advisor offers her business card, printed in accordance with MoBa's corporate design. While the advisor omits this procedure since she and the client already know each other, most advisors consider giving a business card to new clients to be very important: "It shows

to the client who I am" [SUH]. The client takes the card and positions it at his convenience on the table – we observed that the client looked at the card during the session to remind himself of the advisor's name. In parallel to handing over the card, the advisor talks about her background and experience with the topic under consideration. She also says what she is doing: "I will now give you my business card." [SUH, PAB].



A: Allow me to introduce myself. My name is Carolin Hummingbird. I have been working here for four years now. Before this, I spent several years at AbeBank. I have always worked with hypothecary loans. Feel free to contact me with any questions regarding your intentions.

A takes a card from her folder and gives it to C.

C: Thank you.

C takes the card from A, looks at the card for a moment, and then places it on his side of the table.

Receiving the client's presentation

Like the advisor, the client also delivers some basic information about himself and the transaction he intends to make. This happens after a question or other verbal encouragement from the advisor; in parallel, she takes a pen and moves it towards the pile of blank papers, indicating her intention to take notes. She lets the client tell his story and, where necessary, supports it with questions, while taking notes. When the client has finished his story and the advisor has enough data to proceed, she puts the paper with her notes in front of her – in this case, on the client's documents pile on the left in the leather folder. This concludes the initial phase of the advisory encounter.

A: Please tell me more about the renovations you want to do and about the house. You said, it was your father's house?

A looks at the client while taking the pen and slowly putting it to paper.

C: Well, umm, not exactly. He bought the house and let it, as two separate flats. We renovated it together maybe ten years ago.

C looks through his documents.

C: Exactly. It's from 1960 but we renovated it in 2004 and divided it into two flats for rent. We worked there together, which is why I want to keep it so badly. But it needs renovation and I want to move into the place with my wife.

C puts the documents back flat on the table, A makes her notes. A + C continue to talk about the house. A takes notes while occasionally looking at C.

Table 3 Paper practices involved in the organisation of paper artefacts and the initial information collection

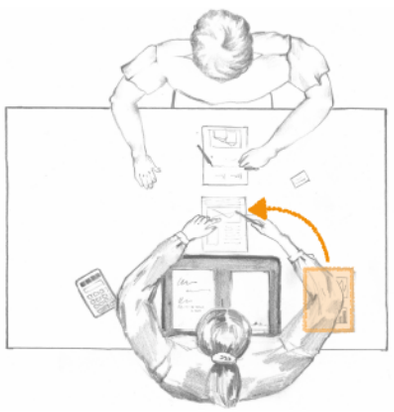
Table 3 lists set central practices participants engage in during the opening of the financial advisory encounter. It points to some interesting facts: The advisor normally prepares a set of documents before the advisory session and then, directly at the outset, she

reconstructs the order of the documents by positioning them across her side of the table. "The order of things is really important to me and it's good when clients see it" [STH], one advisor said, admitting that the impression he makes is a "part of the assignment" [STH]. Documents regarding the client (e.g. transactions on his account or the relevant correspondence) are separate from these documents, including information concerning the bank (e.g. a catalogue of current mortgage products and rates, predictions or suggestions published on the bank's intranet). The empty sheets of paper used for taking notes are positioned so as to allow for quick access to them. The positioning of the paper piles demarcates various areas of the table: the advisor's space, the client's space and the space in the middle. Interestingly, the advisor enters the space first while handing over their business card.

4.2 Practice: Exchanging

We join the participants after the initial exchange of general information, at a moment when there is concrete information transfer. The client learns about the bank's products and the advisor learns about the client's expectations. She needs to collect specific and if possible objectively confirmed information about the property and the client's financial situation to assess the transaction's potential. We observed that paper documents are extensively used for information exchange, even though some information is easy to transfer without the use of documents (e.g. the bank's basic interest are three different figures). Importantly, the practices in Table II occur in varying configurations: while sometimes advisors explain the bank's offering before collecting the property information, others conduct these activities in the opposite order. In our observations, the configuration depends on how much information the client has provided earlier.

Illustration	Example
	Providing information
	To provide a general explanation of the bank's mortgage offerings, the advisor uses a set of prepared documents, including stable depictions and information (e.g. repayment models, mortgage structure or current interest rates) and dynamic content adjusted to the client (e.g. calculations of the desired loan's affordability). Advisors often adjust the bank's printouts to fit the client situation and annotate it with additional information, even though the material is not explicitly designed as a form. Thereby, they not only change the content but also the visual design of a given sheet of paper. Importantly, whenever documents are placed in the middle, the advisor turns them to face the client and she explains them while viewing them upside down. It is only when she is not very familiar with a document or writes down something that she briefly turns it.



A: You see, we as the bank need to ensure that your property provides enough coverage for the mortgage. It means, the difference between what you possess…

A takes the top sheet of paper from the pile on her right and rotates it towards the client. She circles the word Kaufpreis *(purchase price), rotates the sheet back to her and writes* 900 000 *next to it.*

A then points to the 900 000.

A: … and the size of the mortgage…

A circles the word Hypothek *(hypothecary credit).*

A: … is at least 35 percent of the property.

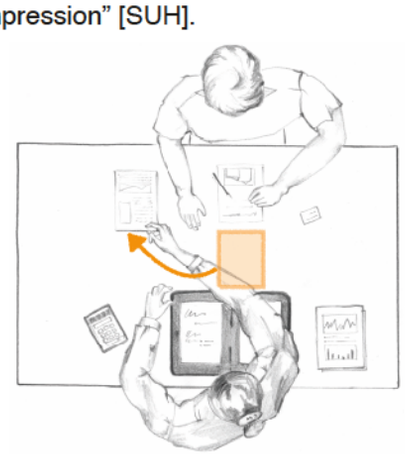
A draws an arrow between Kaufpreis *and* Hypothek *and writes* 35% *next to it, takes a short break while still looking at the paper, and then writes* 315 000.

A: In your case, it would be a bit more than three hundred and fifteen thousand francs. In your case, the difference would be even higher – four hundred thousand francs.

A and C continue to calculate the mortgage's affordability and other factors that would ensure that C could get a loan from the bank.

Handing over the information

Often, after explaining the values or concepts under consideration, the advisor hands the document to the client. As some advisors put it in the interviews: "it is important that the client has something relevant to take home" [RUO, PAW]. Sometimes, the advisor places the document directly in the client's space. When asked for the reason for this behaviour, an advisor explains: "I noticed that this is the right place to put the documents. I helped her, I think. I don't think it made a negative impression on her. Hopefully, I made a positive impression" [SUH].



A: Okay, so, looking at the data, I am fairly sure that you can afford a mortgage on this property.

A looks at C, A and C lean back for a moment and look at each other.

C: Well, I'm happy to hear that.

A: We still need to clarify a few things, right? Let me take this away.

A laughs, take the document from the middle of the table, and places it next to the client's hand.

Receiving information

The client also has documents to share with the advisor – he has information on the property, including the number of rooms, bathrooms, location and year of construction, i.e. information that is relevant for assessing the property as an investment. When the advisor asks for this kind of data, the client may use an official document or a prepared printout. Normally, the advisee puts it in the middle or keeps it in his hand, holding the paper slightly

above the table, so that the advisor can see it. Eventually, the advisor takes the sheet of paper and positions it at her convenience. In most cases, the document is returned to the clients, except if it's an official paper, then the advisor may photocopy it to include it in the case documentation.

A: The bank assesses a property's value before granting a loan. We use a database for this. You have already told me much about the house, but could you also give me some data about the land?

C takes a document from the pile in front of him, rotates it towards A, and points at the section with information on the parcel.

A bends over to read the information presented to her and occasionally looks at C.

C: The land is about half an acre, including a part we shared with the neighbour for the road. This part is about 10 meters long and 2 meters wide.

A sits op straight and completes her notes. She returns to the document presented by C to compare information from her notes.

Table 4 Document-oriented practices emerging during information exchange between the advisor and the client during a financial advisory encounter

Table 4 presents a set of practices that support information exchange between the advisor and the client. The observations point to the middle of the table as the space for interaction and transaction. However, in specific situations, the advisor reaches out beyond this common space and operates in the part of the table that is right in front of the client, and clients show no signs of distrust owing to such behaviour. The client never interacts beyond the middle of the table. Also, when positioning a paper in the middle of the table, he sometimes holds it until the advisor takes the initiative. Both parties have relevant information to be provided and requested (e.g. advisor: interest rates and mortgage system; client: information about the property). The client and the advisor act confidently concerning verbal communication and the content of this exchange. However, interestingly, in the use of paper documents, the client's behaviour (unlike the advisor's behaviour) exhibits signs of reservation.

4.3 Practice: Offering choice

We join the participants after the advisor has prepared a set of specific, client-tailored options for a mortgage. It may be a single option, but often the advisors, driven by client's questions, incorporate specific information into additional calculations. After collecting all the necessary information, the advisor uses her empty sheets of paper and the calculator to calculate several different options regarding loan duration or interest rate type (flexible vs. fixed). While calculating the options, the advisor occasionally talks to the client to elicit his needs and adjusts her calculations accordingly; however, there are a few long, unfilled pauses, where the advisor uses the calculator and notes down the calculations. After the first calculation, she consults with the client to collect information that influences the second calculation, and so on. Each option is clearly separate from the others – the advisor notes each of them on a separate sheet of paper.

Illustration	Example

Parallelising options

Having prepared the various options, each on a separate sheet, the advisor places them on the table. Importantly, the sheets are positioned such that corresponding positions are (horizontal) next to each other and can be taken in at once. In the interviews, advisors report that they wanted to provide an overview of the options. The advisors stressed the fact that this practice is essential in situations in which a new mortgage replaces an old contract: "There, you can show what will be different in the future and what may change owing to changes in the market and in interest rates. You can show that you care and that the bank cares" [STH].

A: Let's start with the straightforward things: you can take a fixed rate for the whole mortgage – you benefit from the currently low rates for the next ten years (…) In this case, you would pay exactly one thousand and twenty francs per month, which includes the interests but no amortisation.

A places the first sheet in the middle of the table; with her finger, she points at 1020 p.m. *written at the bottom.*

A: However, if you want to pay back your mortgage within the next few years, as you suggested, variable rate may be a better option. (…) We would charge you one thousand two hundred per month in the first three months, but the interests may vary. (…)

A presents the second page to C; with her finger, she points to the word Variabel *(variable) and makes a wave gesture, at the end she points at* 1200 *written at the bottom.*

A: And here we have the mix of the two. It's three hundred thousand in fixed mortgage and two hundred thousend variable. (…) This would be something like one thousand one hundred per month.

A presents the third page to C and points to 1120 *at the bottom.*

Comparing options

After positioning the alternatives on three separate sheets in the middle of the table, the advisor compares the figures and calculations across the alternatives. The interaction relies on finger and pen gestures. Some advisors use a highlighter or simple drawings (e.g. arrows up or down) to highlight key differences and assess them. The advisor works through the presented content across the various sheets, i.e. in a horizontal direction. In other words, she uses the structure she established in the previous step. When pointing to and talking about the offerings, the client and the advisor often simply refer to the paper as if the hand-written calculations were the offering.

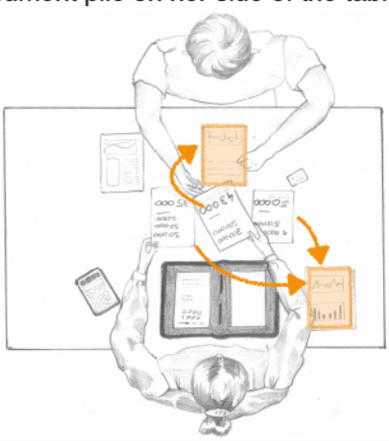
	A: (…) In this option, you pay the lowest monthly rate, but it will remain steady for the next ten years, and here you would have variable rate, which may fluctuate but should become lower as you pay (…) *A points at the rates at the bottom of pages 1 and 2, A looks at C, C looks briefly at A and follows her pen on the pages. C looks up at A whenever she moves her pen.* C: But, I can also pay back in here too, can't I? *C points at page three and raises his head. C looks at A. A moves her pen to page three.* A: Yes, sure, but three hundred thousand is fixed for the next five years, and after those five years, you either pay back everything or you prolong the mortgage with the rates as at 2021. *A points her pen at* 300 000, *circles it and draws an almost invisible line to* 5 Jahre *(five years).*
Choosing an option Having discussed the differences and similarities across the options, the advisor and the client move to the overall assessment of the options at hand. The client often requests more time for further considerations. The client retains the sheets of paper with the most appealing options. The advisor picks them up from the table and hands them to the client. She then picks up the remaining sheets with her calculations and keeps them – on the document pile on her side of the table.	
	C: Can I take this home to talk it through with my wife? *C points at the middle page and almost lifts it from the table. A takes the same page from her side and gives it to the client.* A: Sure. Do you want the others too? C: No, thanks. I think this could be the optimal one for us. *A collects the other pages and puts them to her right. C adds his chosen page to his documents.*

Table 5 Paper micro-practices that emerged during the presentation and the comparison of alternatives

Table 5 lists practices that emerged when the advisor and the client compared the various offerings. The sheets of paper are situated next to each other and compared to each other; this plays a key role. Each sheet refers to a specific offering – in this form, each symbolises an abstract concept, an offering, and they "mean this offering" [PAW]. Importantly, it is the advisor who organises the sheets of paper around the table, moves and marks them. The client limits himself to referring to the sheet of paper or figures. Overall, the choreography of the presentation of the options is built around the hand-written sheets with calculations on them, which in the conversation stand for the de facto offering. An advisor said: "I want the client to know that he gets the offering that suits his situation" [STH]; this impression should result from the comparison of various options.

4.4 Practice: Closing

We join the participants towards the end of the encounter. This may be signalled by a statement such as "If you have no further questions, I will prepare a definite offer for you and will email it to you" or "Feel free to call me as soon as you have slept on it." In all cases, the intention to work towards the end of the session was signalled verbally and acknowledged by both parties, usually several times. At this point, the advisor's interest is to remember all concessions and individual conditions she has made to the client while retaining the impression she established throughout the advisory encounter. After the encounter, the advisor prepares a set of documents on her desktop to be sent via internal mail to the department responsible for acceptance. She will also compose a short report on the service she provided. Thus, the closing part of the encounter is the last time she can check the completeness of her notes and can supplement them.

Illustration	Example

Finalising notes

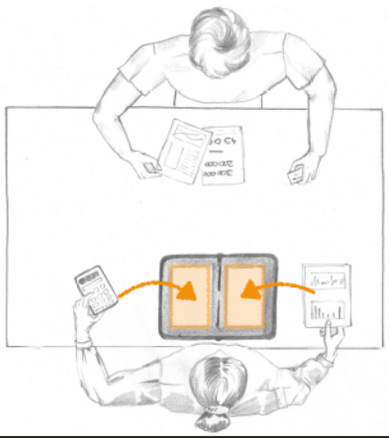
Having initiated the closure of the encounter, the advisor summarises. She reiterates the key points of the offering and her understanding of the next steps, and makes notes on the offering and the subsequent contact. In some cases, she summarises the situation based on her notes and expects a brief confirmation from the client. The advisor also annotates or highlights the collected *to do* list, "so it is easy to see what must be done" [STH]. The client co-engages in the finalisation of notes – he often goes beyond simply confirming the information and stresses specific facts from the conversation.

A: I will send you a message with all the information, and it will be clearly written (*A laughs*) by this evening. Should I call you on Monday to discuss the offering?
C: Yes, please. Monday, around 6 p.m. will be fine. I will have spoken to my wife by then.

A make notes on the sheets of paper in her folder: A writes Mo, 6 *and some information regarding the offer she made to the client, including the figures* 300 000 *and* 200 000. *She draws a line below her notes from left to right. C looks at A, then at her notes, and then at the offer in front of him.*

Folding the interaction space

Having collected and noted all the necessary information, the advisor puts down her pen and gives further non-verbal signs of completion. The client and the advisor organise their documents into a single pile. The advisor puts the documents and the produced notes into her folder, while the client stacks them. They both order the documents if necessary – advisors tend to put irrelevant pieces of paper at the bottom and the most relevant at the top; sometimes they turn the page in the process of organising the papers. The space occupied by each participant shrinks within moments.



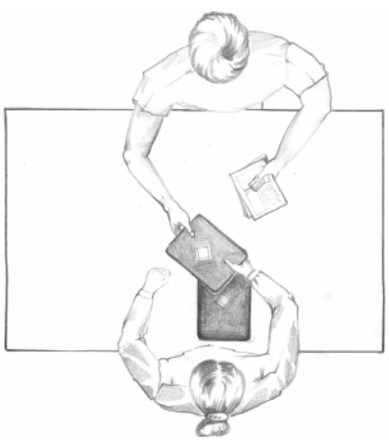
A: Do you have any further questions? Anything I can do for you?

C: No, thank you. I think I've asked everything I wanted to ask. And you'll call me next week, right?

C puts together the documents on his side of the table. A sorts the papers in her folder: client data on the left, prepared printouts on the right, calculator on top of them, her pen in the middle. She closes the folder and leaves it on the table. A looks at C and nods.

Closing the interaction

While the advisor's leather folder remains on the table, next to the advisor, the client collects his papers and picks them up from the table. If the client does not have a folder with him, he takes the documents, lifts them and tries to form a consistent pile – in this situation, the advisor offers him a MoBa-branded folder. Having collected his documents, the client takes his leave.



A: Yes, I'll call you. And don't hesitate to contact me if anything comes to mind… You have my card, not so?

A looks at the documents C lifts from the table. C also looks at them. The business card is visible at the top. C nods.

C: Yes, I have it here.

A: Wait, I'll give you a folder.

A turns around, takes a folder from the shelf and gives it to C half open, so that he can open it easily and put his documents in the folder. A retains eye contact with C. C nods.

C: Great. Thank you…

A and C make small talk, later say goodbye and leave the room together. A returns a few moments later and picks up her leather folder.

Table 6 Paper practices observed in the closing phase of the financial advisory encounter

Table 6 summarises the practices that emerge towards the end of the encounter. After finalising the notes, the participants literally fold up their interaction spaces. When the work artefacts disappear, the working character of the encounter lowers and the tone changes: more small talk and courtesies fill the conversation. An advisor explains: "I want to satisfy the client as much as I want to satisfy the bank. (…) Knowing that I can close my folder, seeing that the client leaves the encounter satisfied and relaxed, knowing they can buy their new house, is what I strive for" [STH]. Another said: "At the end of the encounter, you know whether you made the impression you sought to make" [SUH]. The relaxed atmosphere visibly emerges in parallel to packing up and putting away the documents.

After returning to her office, the advisor engaged in the post-processing of the case: she sorts out the irrelevant notes and calculations, put the relevant ones in the sleeve

reserved for this contract, writes a report in the banking software system, including key data about the client and the mortgage advised on. If she has no imminent appointments, she fills out the set of forms the bank needs to process the case. Otherwise, she puts the sleeve on a pile of other sleeves – cases to be processed.

5 Discussion

5.1 Paper practices and institutional talk

The results present a set of paper practices we observed across a range of financial advisory service sessions. As noted, an advisory encounter unfolds around the documents and papers used therein, even though these practices occur to the advisors as natural and implicit. The advisors' statements illustrate how they embody the practices and see them as integral to their daily advisory conduct. The movement and positioning of paper on a table resembles the typical activities of an advisory encounter, i.e. information collection, information provision and recommendation (Verhallen et al. 1997; Jungermann 1999; Jungermann and Fischer 2005; Moulton 2011; Bradbury et al. 2015). When the advisor moves a sheet of paper towards the middle of the table, this action is information provision. When the advisor studies a paper-based document provided by the client, this action is information collection. Finally, when the advisor presents a set of paper documents on options, the advisor's activity is about comparing and offering choice (i.e. recommendation). While studies have identified the set of general activities and have formalised them into phases of financial service encounters (Oehler and Kohlert 2009), we go one step further, arguing that these activities are paper practices, i.e. embodied sets of micro-behaviours oriented towards paper artefacts.

We point to the dependency of institutional encounters on the material, including paper documents. While previous research stresses institutional talk's dependency on scenarios, contexts, constraints and institutional identities (Drew and Heritage 1992b; Heritage 2005), we show how an encounter's institutional character is reflected by the material conduct. The actions done with and to paper illustrate the participants' roles and the relationship between them: the advisor introduces phases of the service and addresses knowledge differences by placing specific documents on the table, moving them and emphasising specific information thereon. Statements from the interviews confirm how the understanding of their roles (e.g. satisfying the client and the bank) relate to the material conduct (e.g. closing a folder or placing a sheet of paper on the client's side). While there are types of institutional talk in which no interactional artefacts are used (e.g. telephone calls), most examples of institutional talk in a face-to-face setting have a strong material element in the interaction: doctors and therapists hand over prescriptions, use tools to make prescriptions and take notes (Peräkylä 1993, 1995; Skelton and Hobbs 1999; Couture 2006; Pearce et al. 2008, 2009), police interrogations are clearly oriented to creating an artefact (e.g. a report) (Atkinson and Drew 1979; Adelswärd et al. 1987), sellers and buyers exchange products and money (Clark and Pinch 1986; Darr and Pinch 2013), and educational settings extensively use text documents to structure interactions (Svinhufvud and Vehviläinen 2013; Hazel and Mortensen 2014; Mondada and Svinhufvud 2016; Svinhufvud 2016). We extend this catalogue of findings while presenting how paper is used to structure interactions during financial advisory encounters – another type of institutional talk. Given the evidence for a prominent role of material in service encounters, we conclude that the definition of institutional talk should be extended to acknowledge the key roles of various artefacts, including paper documents.

The ways paper is used in financial service encounters resemble the distribution of conversation rights; verbal dominance of one participant in an institutional encounter is seen as their key characteristic (Adelswärd et al. 1987; Itakura 2001): the provider controls, among others, time and turn allocation, i.e. the distribution of conversational resources. Similarly, as our results suggest, the provider controls the distribution of resources relating to manipulation and use of objects in the interaction: not only does the advisor control the middle of the table, i.e. in the shared interaction space, but she also reached into the client's space and placed documents there, as in case of *handing over information*. In other words, she controlled the space allocation in the shared space and granted access thereto. Studies of paper's use in education counselling point to the manipulation of paper documents as an interactional resource that helps to chronologically structure an interaction (Svinhufvud and Vehviläinen 2013; Hazel and Mortensen 2014). The results show that the ways paper and material are used during a financial encounter may also emphasise the asymmetry between the participants: asymmetry in interactional rights is reflected by the control of the interaction space and knowledge asymmetry is reflected by the transfer of documents. We shed light on paper's use in institutional talk: manipulation and maintenance of paper documents helps to structure an interaction, as discussed, but also mirrors and reinforces the institutional identities and the asymmetry between them.

Previous research saw the institutional setting as a form of theatre, with its own dramaturgy (Darr and Pinch 2013). While this metaphor may hold in some contexts (Clark and Pinch 1986; Pinch and Clark 1986; Darr and Pinch 2013; Wooffitt et al. 2013), we propose two further metaphors: a *card game* and *dishing up at a restaurant*. As in a card game, each participant in the financial service encounter starts with his or her hand, and they play their hands in accordance with the institutional rules and their roles, i.e. they place their cards in the middle of the table, forming a board (also called the 'window' in poker). The advisor has the role of the dealer and a player, while the client only plays in some rounds. Nonetheless, a card game differs from advisory service: A card game finishes with a win or lose for one player, which don't directly apply to the financial service encounter – being a type of collaborative problem-solving, the interlocutors don't play against each other but with each other (Dolata and Schwabe 2017a). The financial advisor and the advisee don't play blackjack, but are rather involved in jointly solving a game of solitaire or playing split. The card game metaphor explicitly addresses the visible choreography of paper practices rather than the deep reasoning behind it: if we consider the *information provision* or *the choosing of an option*, a sheet of paper not only changes places and owners, but moves from a hand to the board and then to the pile of inactive cards. When designing financial advisory encounters, it is important to acknowledge the fact that sheets of paper may have different meanings depending on their position, as in a card game. Thus, this metaphor is a valuable frame for understanding and presenting the statuses of different sheets of paper: the active cards form the board, the ones to be played soon are in a hand, and the inactive ones remain in a pile. Similarly, the interlocutors are focused on the board, control their hand to know what else there is to talk about, and pay attention to the pile only upon request.

While the card game metaphor provides a view of the choreography of papers in the financial advisory encounter, the *restaurant dishing up* metaphor explains its choreography, especially during *organising* and *folding*. A visit to a fancy restaurant starts with seating the guests and offering them the menu; the waitron then offers beverages, supports clients to choose from the menu – involving a sequence of collecting a clients' wishes, suggestions and recommendations, as well as arranging the crockery on the table. The course of events

and the composition of the ingredients on the plate are planned. The more exclusive the restaurant, the higher this ceremony's value: the clients should not just enjoy their meal but the entire experience. Based on an advisor's statements and actions, which stress the desire to satisfy the client and show the organisation of the interaction space as an anticipating behaviour, we claim that advisors take the role of a servant when engaging in a well-coordinated choreography throughout an encounter. The metaphor goes even further: while the performance is primarily oriented at taking care of the client and their needs, the advisor and the waitron both depend on a successful transaction: the waitron may hope for a great tip and the advisor for additional income (depending on the bank's policy) or, at least, appreciation from her superiors or colleagues. Thus, advisors are motivated to engage in practices that positively impress every client.

The card game and restaurant metaphors can support the design of interactive systems for financial service encounters and similar institutional settings. Thanks to its tangible character, the card metaphor can be more directly applied in the design of such systems than a dramaturgical or theatrical notion of such an encounter. Thanks to its experiential character, the restaurant metaphor provides a better sense of elegant, coordinated interaction between a client and an advisor. We claim that blending these two metaphors will lead to a better understanding of what things mean in a financial advisory encounter and what will better guide the design of appropriate IT.

5.2 The semiotics of paper in practice

Our results illustrate how the various practices in a financial advisory encounter rely on a relatively small set of paper's physical affordances. Thanks to the identity of content and presentation and, thus, the high predictability of paper (Gaver 1996), both parties can easily assess the state of the other side and can assess how much is left to discuss. The same paper quality allows one to build an ad hoc structure, as in the parallelising practices, by simply putting sheets of paper next to each other (Gaver 1996). Even though single documents have a linear character, paper as a medium affords re-ordering and the creation of a multidimensional picture, as in *parallelising* and *comparing options*. All these possibilities relate to paper's physical features: it affords effortless moving and holding above a table (Sellen and Harper 2002); in combination with a pen, it enables scribbling, writing and marking, to even further support practices involved in comparing or exchange (Sellen and Harper 2002). A financial advisory encounter leverages many but not all affordances of paper: For instance, neither an advisor nor a client folds a sheet of paper or tears it up. And only in very few cases do they deviate from the linear structure of a paper document (top-down, left-to-right). Thus, they use the flexibility of paper concerning input and physicality (Gaver 1996) only to a low extend. This exemplifies how, in accordance with recent changes in ecological psychology (Leonardi 2011; Charles 2011; Overdijk et al. 2012; Fayard and Weeks 2014), the context-free consideration of affordances may differ from de facto uses. As the results show, it is not the routines' overwhelming flexibility that escapes the limits of affordance theory. Instead, the practices are arranged in accordance with the character and goals of an encounter, and some actions could simply destroy the intended impression: tearing up paper could indicate that the documents on the table are not important; going beyond the boundaries of a sheet of paper could dissolve the impression of a perfect and enclosed service, etc. In other words, the choice of paper's available affordances in financial service encounters are limited by the meanings of paper in this interaction as something that provides the structure, persistency and shared view of the information.

The meanings (i.e. the semiotics) of paper vary across a single encounter. The identified practices provide a lens to abstract from particular occurrences and, through intersection with other practices, explain the meanings of a sheet of paper in an episode (Scollon 2001; Weilenmann and Lymer 2014). Our study shows that paper stands for concepts and elements that are central to an encounter: Paper stands for an offering when it is placed on a table along with other documents. Paper stands for a house when it includes an advertisement of it and is presented for information exchange. Finally, a file or folder with a set of papers stands for a specific case that must be processed. Also, each of the documents that enter the interaction have meanings attached to it: The advisor reviews and prepares all her documents in advance. When a document comes from a client, the advisor will treat it as a data source and will collect information. In other words, the advisor will attach a meaning to this sheet of paper and will process it accordingly. The ways financial advisors interact with documents are not driven by the documents, as suggested by the studies on the uses of forms and documents in institutional settings (Heath and Luff 1996; Berg 1996; Moore et al. 2010). The uses of papers that may enforce specific behaviours in financial service encounters (e.g. forms or guides) are very limited. In turn, the advisor is the one who organises the papers in a way that affords a specific way to collaborate. Thus, she projects her own behaviour on the documents and influences the client's behaviour. Bringing about a specific client behaviour has been presented as a practice specific to selling encounters (Clark and Pinch 1986; Pinch and Clark 1986). We argue that the occurrence of such practices in financial advisory encounters relates to their commercial character, in contrast to non-commercial institutional settings, which rely on the explicit communication of expectations (Svinhufvud and Vehviläinen 2013) or persuasion (Dolata et al. 2016).

Interestingly, the advisor operates mostly with the form, the movement and the placing of the paper. She guides the steps of the encounter by moving sheets of paper to the middle of the table, closes a topic by putting them on a pile of papers, and changes the topic by pointing at specific areas on sheets of paper. In other words, the practices related to the overall structuring of an encounter depend on the material nature of paper (Mikkola and Lehtinen 2014; Weilenmann and Lymer 2014) rather than its textual nature. The advisor attends to a document's content when she collects the information or makes general notes. However, both participants are involved with the content, most prominently when the advisor calculates the alternative offerings and refers to them when comparing the alternatives. When moving horizontally and vertically across the three alternatives, she keeps changing the focus every time she points at a place on a sheet of paper. However, this horizontal and vertical moving is only possible owing to the specific placing of sheets of paper on a table. Thus, the practices involved in offering choice exist at the intersection of the material and the textual nature of paper. In other words, the meaning of the paper in, for instance, parallelising, results from paper's material nature in combination with its content.

When addressing the tension between paper's affordances and paper practices, one must consider their inherent dependence (Schmidt 2011; Wulf et al. 2011; Shove et al. 2012): changing affordances will change practices, and changing practices may result in a demand for artefacts with specific affordances. In financial advisory encounters, we observed how specific affordances are reflected in practices, which – in turn – are subordinate to the encounter's overall character and its implicit goal: impressing the client. Replacing existing affordances of paper, for instance, by turning it into a form, will necessarily transform the practices, and will eventually make them incompatible with an

encounter's goals and with other practices, such as conversational practices (advisors often use specific phrases that need to be adapted to new circumstances). However, if new affordances stepwise extend existing ones, one may expect a calm and long-term transformation of practices. Consequently, we claim that suitable support for financial advice will preserve existing practices and will extend existing affordances.

5.3 IT design for paper practices

Our study results point to practices that leverage the material and textual natures of paper to impress a client. They also make clear how paper changes its semiotics: a sheet of paper in the middle of the table along with other similar sheets means an option; a single sheet of paper moved to the middle of the table means the provision of a fact; a single sheet of paper on a pile means an activity to be done or that has been done. Finally, our results show how the practices relate to the institutional identities of the interaction partners: the advisor, who has more interactional rights owing to her position, actively operates in the larger space on the table, reaching well into the client's space; the client, who has fewer rights, remains passive and operates only if requested to do so, in their area, up to the middle of the table. Overall, paper is not a part of an advisory encounter only owing to the missing alternatives, but because it affords subtle practices that go beyond those postulated in the literature: information collection, information provision and recommendation (Jungermann 1999; Jungermann and Fischer 2005; Oehler and Kohlert 2009). Thus, unsurprisingly, the prototypes and proposed solutions that use such models (Nussbaumer et al. 2012; Heinrich et al. 2014a; Kilic et al. 2015, 2016) have a hard time finding their way into financial advisors' daily practices (Schwabe and Nussbaumer 2009; Heyman and Artman 2015; Kilic et al. 2016). This insight urges us to question the available technological solutions and their potentials for practical use in financial advisory encounters.

A desktop computer with or without touch input may seem a natural choice for supporting advisory encounters. Desktops are well spread across institutional settings, the setup and training costs are low, and users can adapt easily based on their experience. Thus, advisory rooms are often equipped with a desktop PC, which can be used during advice-giving, for instance for quick calculations or information collection (Pearce et al. 2008, 2009; Giesbrecht et al. 2013). However, such systems do not support *paper practices*. For instance, *parallelising* is limited by screen size and requires additional adjustments. But there is more to it than this: First, the interaction space in such a scenario is limited to the desktop PC's screen, and there is no possibility for the client to access it other than through the advisor (Arvola 2004); the advisor not only dominates the interaction space, but fully controls it and is the only one with access to it; however, the overall space is much smaller – this destroys the typical power equilibrium of institutional talk. Second, the semiotics of objects differs from paper: while an empty sheet of paper in a financial advisory encounter acquires its meaning through interaction and positioning, the semiotics of elements on a desktop depend mostly on their graphical design. Third, the production of a desired impression will necessary relate to the design of the software running on the desktop; while in the paper-based advisory encounter, the advisor may use simple means (e.g. ordering papers) to convey the impression of order and control, this may be difficult in a fuzzy and messy design. Thus, the desktop PC and its screen, solely owing to its size and input possibilities, are no match for paper.

Tablet PCs in various forms and sizes are flooding the market and have led to design efforts in many areas relating to advisory encounters (Pyykkönen et al. 2013). Some

financial institutions have equipped their advisors with tablets to support their advisory encounters and use them as assets in their marketing (Maetje 2014). Based on our observations, this may be problematic – while mobile devices are appropriate for mobile advisory settings (Giesbrecht et al. 2015; Comes and Schwabe 2016a), they have drawbacks in a stationary, table scenario. If one envisions a tablet as a standalone support system for the advisory encounter, it will probably replicate many of the desktop PC's issues, including limited interaction space and the access issue. Nonetheless, tablets offer an improvement compared to the standard desktop PC: one can easily reposition a tablet, hand it to an interaction partner, or rotate it when necessarily. However, this is not enough: First, getting an overview with a tablet is problematic, be it during *parallelising* and *comparing the options* as well as concerning representing a pile of papers. Further, the input options for tablets, despite recent improvements, remain limited: virtual keyboards take simply too much space on the display, and the stylus solutions have tangible feedback and responsivity issues. Second, a tablet's semiotics doesn't remain stable: as soon as the content on the screen changes, pointing at the tablet and saying "this" will result in confusion. Third, impressing a client through the choreography of a single movable device may be easier than in the case of a desktop PC, but harder compared to paper-based choreography. In summary, while tablets are an improvement over desktop PCs, they lack the natural features of paper and are still simply too bulky and too expensive to directly replace paper – the vision of using many tablets in parallel, like sheets of paper, goes beyond what is doable today. Still, tablets may dominate the stage owing to the aforementioned regulatory requirements and their popularity in mobile scenarios (Maetje 2014; Giesbrecht et al. 2015). Thus, transferring paper practices to tablets may turn out to be the next challenge in financial service encounter design.

If the table is such an important element in the advisory encounter, why should it not become an interactive space? Existing solutions point to the potential of well-designed support systems for advisory encounters using Surface table-top devices (Nussbaumer et al. 2012; Heinrich et al. 2014a, b). Table-tops provide a digital, touch-sensitive space that can be easily turned into an interaction space; widgets or virtual sheets of paper can be moved around and rotated in a 2-D plane of a size comparable to a table; with appropriate design, they can be placed parallel to each other in the middle of the space; also, the client area and the advisor area can be identified. Thus, the power equilibrium bound to the access rights to the interaction space might remain stable. Seemingly, many of the identified practices can be supported by such a tool, but why do we not encounter them in financial advisory practices? As the research shows, some clients tend to exhibit very passive behaviour when the advisor interacts with a computer rather than paper (Kilic et al. 2016). Also, problems may occur if one of the parties starts taking notes – the resolution and sensitivity of the tablets available on the market are below the parameters needed for a seamless writing experience – replacing natural input with a keyboard limits the access to the interaction space, as in the case of a desktop PC. Also, *handing over information* and *receiving information* from a client's document will generate a media break. Second, while the semiotics of an element on the table, under the assumption of good design, will possibly remain clear, the semiotics of a pile of papers and the tacit information related to the tangible thickness of such a pile will disappear. Third, the impressions resulting from the choreography of movement and gestures will be limited by a system's design and by the 2-D interaction space; while holding a sheet above the table may be considered an extension of a movement, developing *extension gestures* and the semantics behind them for table-tops have not yet been considered. While the use of interactive table-tops

generally allows for the thorough redefinition of existing practices and seems to offer a promising solution, limitations in dimensionality, sensitivity and resolution point to a set of challenges that must to be considered.

Recent developments regarding augmenting paper with digital technologies open further possibilities for the design of support systems for advisory encounters (Luff et al. 2007, 2009; De Sá et al. 2009; Butscher et al. 2013; Meredith 2015; Butt and Navarro 2016). When discussing the potential of such a system to support paper practices, we envision a system consisting of an 8K UHD overhead projector illuminating a table and connected to a computer. The computer receives information from a motion-sensitive camera and a digital pen to interpret the following input types: the positions of various sheets of paper, their movement, hand-based gestures and handwriting. We argue that such a system has the potential to support the practices listed above, but requires additional semantics to interpret the ongoing actions: First, with such a system, the interaction space is exactly the same as in the original situation; paper can be moved, rotated and lifted above a table; also, the power equilibrium is preserved as long as the system can recognise and identify both parties. Second, to add value compared to the original situation, the envisioned system must be able to attach simple meaning to single sheets of paper – for instance, based on *handing over*, the system revises the owner of a sheet of paper and the attached information, based on *parallelising*, it identifies the information as options to be chosen from and based on the position of a paper in a pile, it suggests appropriate actions. Third, the impression of a professional and well-designed service can be enhanced by including additional, professional and interactive graphic elements projected onto paper; such graphics could support the diagrams drawn by advisors. Launching and shutting down the application can be synchronised with *unfolding* and *folding the interaction space*, and *receiving information* from the client could be supported by ad hoc scanning functionality. *Providing information*, as well as the calculation necessary for *parallelising* and *comparing the options* can be improved, such that the presented information is constantly updated and adjustable. These envisioned abilities set a range of technical requirements for the system: recognition of sheets of paper, handwriting recognition, the delay-free tracking and visualisation of movement, the identification of piles, persons and other elements, and specific grammar of interaction in advisory services, including possible transitions. Nonetheless, given the importance of paper practices in institutional talk, this may open the door to effective support thereof.

6 Limitations and conclusion

Our results also have limitations, specifically regarding the applied methodology and the presentation of results. A rigid EMCA-like analysis would require concrete data, such as real-time recording of the unfolding interaction and blow-by-blow transcription, emphasising the study's reliability and internal validity. However, truly externally valid observations are only possible 'in the wild' – at the workplace in the de facto context. Since it was not possible to make reliable recordings at the bank and to observe further instances of mortgage advisory sessions during the time reserved for contextual inquiry, we decided to combine the data from the de facto context with the data obtained in the experiments, which led to a complex and vulnerable study design. This, we gave priority to the external validity and saw the field observations as a primary data source. Thus, the results, including the examples, are a reconstruction of the unfolding interaction from the notes, rather than a transcription of a single de facto event, which could possibly include

more conversation statements from the participants. Still, the analysis was conducted with a great deal of care and with the use of strategies typical to the interpretative studies (coding, clustering, grouping, etc.).

Thus, our study offers a comprehensive description of the paper practices that occur in a financial service encounter underpinned by observations from the field as well as insights obtained through video analysis and workshops. We offer numerous insights that point to paper's complex roles in financial advisory encounters: First, paper is used by the advisor to impress a client, i.e. to induce specific emotions in the client and to transfer an impression of the bank and the advisor as trustful and orderly actors. Second, it has a meaning on its own, which depends on its position on the table, its content and its participation in specific practices. Finally, it embodies the encounter's institutional nature, confirms the advisor's interactional dominance, and has institutional identity on its own – designated for instance by a logo. Paper is far more than a medium for saving and presenting information: it is an interaction resource, a semiotic resource and an institutional resource; all these aspects of paper come into play during a financial advisory encounter.

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PAPER V

Persuasive practices: learning from home security advisory services

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Abstract
Research on persuasive technologies (PT) focuses, primarily, on the design and development of IT for inducing change of individual's behavior and attitude through computer-human and computer-mediated influence. The issue of practices in co-located human-human persuasive encounters remained unattended in the PT community. This study uses the notion of persuasive practices to understand the course of events in face-to-face home security advisory sessions – it specifies and illustrates such practices and discusses their impact on the persuasiveness of the encounter. Furthermore, it presents potential of IT to support such persuasive practices thus opening new research possibilities of PT research.

1 Introduction

Persuasive technologies (PT) are engineered to reinforce, change or shape behaviors and attitudes of individuals towards specific areas of their life (Oinas-Kukkonen and Harjumaa 2008). Technology can either directly influence an individual's behavior or, alternatively, act as mediator or moderator of social influence (Stibe 2015), i.e., it transfers information on other's opinions or behaviors. In this study, we explore yet another role that technology plays in the context of persuasion: it can facilitate persuasive practices in situations where human influence is exhibited in a face-to-face encounter. There exists a category of such encounters where considering solely the technology – a view that has dominated in PT community so far – does not resemble the complexity of conducted activities and their effect on the persuasive effect. We postulate, that, in such situations, the IT should not be considered as a standalone factor in the success or failure of persuasion efforts – it is not a *machine* that produces persuasiveness. Instead, it becomes a *tool*, which – if embraced in specific practices – can be very effective and support the change of persuadee's attitude and behaviors (Budde and Züllighoven 1992). Such perspective on PT helps, in particular, in high-touch situations, i.e., where direct influence between humans through practices comes to the fore. Practices are seeable, indigenous actions that participants directly engage in, but do not attend to them in an analytic manner (Garfinkel 1967; Nicolini 2012). Still, practices can be object of systematic analytic approach in research (Nicolini 2012) – their consideration in the area of PT is a response to the recent call for the practice-turn in human-computer interaction (Kuutti and Bannon 2014).

In the current study, we focus on the case of home security (HS) advisory services. It is an encounter between (1) a help-seeking homeowner, who wants to make their property more secure (persuadee), and (2) a professional HS advisor (persuader). Even though persuadees often see the need for improving their home's security, they lack ability and motivation to tackle those issues. HS advisory service shall make it easier for them to reach their goal: its goal is to identify most important flaws and pave the way for improvement through mechanical upgrades and security-aware behavior. However, according to a preliminary study, only 20% of improvements suggested during the advisory sessions are implemented by the homeowners (Schwabe et al. 2016). Given the reportedly successful application of PT in other difficult areas, e.g., preventive healthcare, we propose to include its basic principles in a HS-dedicated *socio-technical persuasive system*, which we define as an information system designed to reinforce, change or shape persuadee's attitudes or behaviors (Oinas-Kukkonen and Harjumaa 2009). It consists of a human persuader who engages in *persuasive practices* with use of his tools such as: IT, brochures, notebooks, and exhibits, as well as objects in their surroundings, e.g., windows and doors at persuadee's home. We understand persuasive practices as practices that exhibit the desire to influence the behavior or attitude of conversation partner. We subscribe to very local and timely-limited notion of practices like the one used in conversation analysis (Hutchby and Wooffitt 1998) or multimodal analysis of encounters (Kress 2009). Such practices, normally, involve use of tools and artifacts, which, in turn, shape the practices – the materialistic and social perspective intertwine and form a socio-material view (Suchman 2007). So far, the socio-material character of IT in persuasive encounters did not attract much attention in research. In particular, the relation between design of PT as a collaborative system and the course of events in persuasive encounters

remains unclear. The current study addresses this gap while taking an exploratory mixed-method approach.

To frame the exploration we formulate our research questions as follows:
***RQ 1**: What persuasive practices emerge in persuasive encounters of HS advisors?*
***RQ 2**: How can we support the persuasive practices of HS advisors by means of IT?*
With these research questions in mind, we aim at presenting persuasive practices employed by the advisor with and without an IT tool designed along the basic guidance originating from the field of PT, and we want to show how the application of such IT-enhanced practices improve the persuasive character of the encounters.

2 Related Work

The scenario we address in our research clearly relies on interpersonal, face-to-face persuasion. This mode of influence so far remains outside the core focus of the discourse on PT. We propose to supplement the traditional conversation-based encounter with IT designed, explicitly, to support the persuasion efforts. While it differs from the core PT literature, reconsideration of it informs the design of the proposed tool.

Interpersonal Influence and Persuasive Technologies: Persuasion, being defined as "human communication designed to influence the autonomous judgments and actions of others" (Simons and Jones 2011) as well as "a successful intentional effort at influencing another's mental state through communication in a circumstance in which the persuadee has some measure of freedom" (O'Keefe 2002), relies on interaction between two actors. Conventionally, the persuader provides arguments (O'Keefe 2002) and appeals to the deep human drives of the persuadee (Cialdini 2007). The persuadee does or does not undergo changes in their attitudes and behaviors with regard to a topic (Cialdini 2007). This highly interactive nature of persuasion finds acknowledgement in the area of PT where technology is postulated to substitute human and establish a computer-human persuasion scenario (Stibe 2015).

Conventionally, two perspectives emerged within PT research of how technology influences the behavior and attitude of an individual: (1) computer-human influence and (2) computer-mediated human-human influence (Oinas-Kukkonen and Harjumaa 2009). Persuasive systems belonging to the former category rely on the assumption that technology can act as social agent and, thus, impact the behavior of an individual (Stibe 2015). In cases where technology acts as mediator (e.g., blogs, forums, and social networks), the individual's behavior or attitude underlies social influence in form of user-generated content mediated by dedicated technology (Harjumaa and Oinas-Kukkonen 2007; Stibe 2015). Recently, a novel technology-dependent mode of persuasion was proposed: computer-moderated influence (Stibe 2015). Systems belonging to that category transfer information on the behavior of others and influence an individual's behavior or attitude by promoting behavior-based and not content-based social influence (Stibe 2015).

According to the seminal paper of Fogg (2009), persuasion is likely to be successful when three interrelated factors are addressed: *motivation* related to the feeling of discomfort and rejection of current state, *ability* describing how simple or difficult it is to reach the target behavior, and *trigger* being a signal, facilitator, or spark that tells people to perform the change at a particular moment (Fogg 2009). Those factors were developed in the context of computer-human influence, but were applied as design guidelines for computer-mediated influence too (Muntean 2011). We argue that software developed

along those lines, will contribute to the emergence of relevant persuasive practices and thus support persuasion in face-to-face persuasive encounters.

Persuasive Practices: The topic of persuasive practices – as longitudinal gradual changes – was addressed in relation to ubiquitous systems informing users about their behaviors and bringing about change in their attitudes and behaviors (Rogers 2006). Such systems do well in scenarios with clear goals and clear ways to reach them, such as in the case of WaterBot (Arroyo et al. 2005) where the information on used water motivates the user to reduce water wasting or in apps inducing change in the life style (Rogers 2006). However, in the scenario of HS, the ways of improving things are not straight forward and require involvement of a human actor who can establish understanding for security issues and related topics.

Persuasive practices employed in the traditional service encounters, relying on interpersonal influence, aim at securing the attention of the persuadee and at ensuring the right pre-condition for transferring the message (Blundel 2004). As discussed in consulting literature, this involves directly addressing the persuadee, posing questions and provocative statements, as well as using various encodings (Blundel 2004). We expect that an IT tool equipped with dedicated features will impact the way the advisor engages in such practices, thus changing the general impression on the persuasiveness of the HS advisory service.

3 Methodology

Preliminary Studies: This study is a part of a research program on burglary-prevention conducted in collaboration with the responsible authorities, i.e., state police departments from Germany and Switzerland. The preliminary studies focused on shadowing the advisor at real HS advisory sessions, interviews with the involved stakeholders, and formative tests of the proposed technology. It enabled us to better understand how the advisors see their main task and how they behave during advisory sessions. It pointed to persuasion as a central issue in this context.

Technology Design: The tool was designed in a user-centered process according to the requirements collected from stakeholders: advisors requested access to materials they know (schemata, pictures) and wanted an easy-to-carry device; homeowners requested a better understanding of the complex information and more personalization; and authorities requested more standardization of the advisory service. The tool shall improve the persuasive character of the encounter to make the persuadee tackle the security issues. The design was inspired by the persuasion model by Fogg (2009): The tool offers a list of standard needs and fears to give the advisor a possibility to address the emotions and appeal to persuadee's *motivation* (cf. Figure 13a). It offers multiple ways of visualizing important technical and behavioral information to address persuadee's *ability* (cf. Figure 13c and 13d) (Comes and Schwabe 2016a). A prioritization tool and means to email a PDF with the priorities to the persuadee establishes a *trigger* (cf. Figure 13b) (Comes and Schwabe 2016a). We use the tool as a vehicle to observe emerging practices and compare them to the non-IT condition.

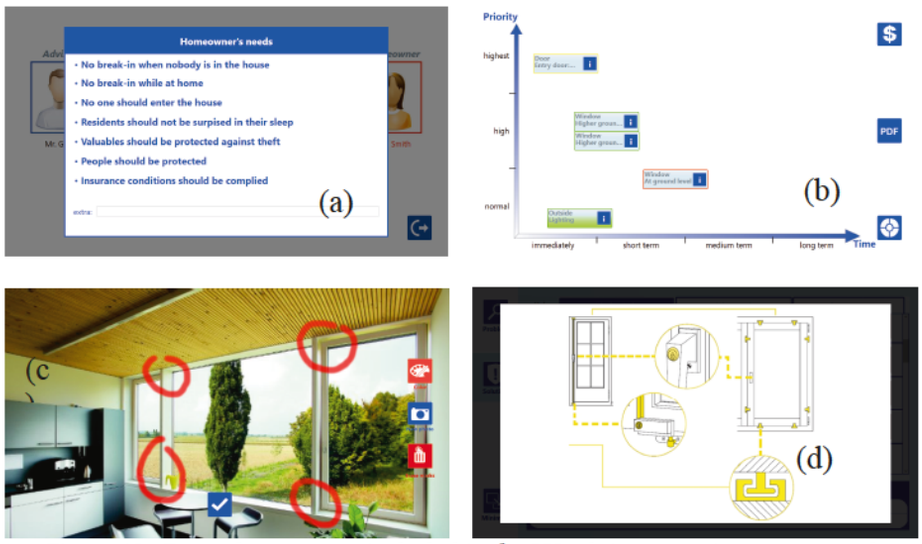

Figure 13 Exemplary screens included in the HS advisory service support tool
(a) Homeowner's needs, (b) Prioritization, (c) Photo taking and annotation, (d) Schemata.

Data Collection: The setting we chose for data collection enables for a natural interaction in a realistic setting. Collecting data from real advisory sessions is nearly impossible because homeowners are reluctant to agree on recordings of their private properties and, in particular, the security flaws thereof. Identification of low-level interactional and conversational practices requires extensive and possibly multimodal data set (Hutchby and Wooffitt 1998). We therefore conducted a design experiments (Mettler et al. 2014), thus presuming that introduction of an IT has impact on conversation practices and aiming at their identification.

The overall experiment followed the within-subject design with two conditions: IT and non-IT. It was scenario-driven: each test person was asked to put oneself in a position of a homebuyer who visits two different houses with a home security advisor to receive advice on how to make their future property more secure. No advisor saw the same property twice. We compensate for the order effects while alternating the conditions order. Overall, 20 persuadees and 10 advisors participated in the experiment. Whereas the advisors were policemen who conduct HS encounters on daily basis, the homeowners were a convenience sample acquired through different channels including social media – their age, status, and gender varied, but all of them knew the feelings around buying a new house – they were in a similar situation before. They were not paid for their participation – they were doing it out of interest and received inexpensive gifts after the test. The test was conducted on five days in March 2015 in Mannheim and Frankfurt, Germany, at a pre-fabricated houses fairs. Before the experiment, each advisor participated in a day-long training on the features of the tool and could try it out in role-play exercises. The trainings took part in the same week as the experiments. Additionally, brush-up trainings were conducted on the day of the experiment.

After going through two advisory sessions (IT and non-IT), each persuadee attended a survey and a semi-structured interview built around the topic of interaction quality (e.g., mutual understanding) and persuasion (e.g., emotional response, motivation, ability). In the survey, each participant answered questions related to perceived persuasiveness (PERS) and design aesthetics (DESA) of the encounter on a five-point Likert scale adapted to reflect the HS advice (Lehto et al. 2012). Overall PERS score were computed based on answers to the such questions as: (1) the *advisory session* (AS) influenced me, (2) the AS was tailored to me personally, (3) the AS makes me rethink my security behavior. DESA

score uses on the following: (1) the AS uses attractive tools, (2) the general appearance of the AS is appealing, (3) the AS provides nice visual experiences (Lehto et al. 2012).
Data Analysis: The collected data in form of video and audio recordings was analyzed by an experienced researcher. First, the audio recordings were transcribed. Second, annotations regarding the ongoing actions of advisor and the persuadee were attached. Third, a portion of data (10 random samples of fifteen minutes from various recordings) were taken to identify criteria for interesting episodes – all episodes considered relevant (i.e., including persuasive practices) by at least two researchers either of the following occurred: directly addressing the persuadee with questions including second-person personal pronoun (Engl. "you", Germ. "Sie"), directly addressing the persuadee through directive speech, or directly addressing the persuadee with statements including modal auxiliary verbs (Engl. "you may…", Germ. "Sie mögen…"). Fourth, all episodes extracted from the videos based on the criteria (446 episodes) were clustered based on their similarity in an interactive session involving two researchers. Fourth, abstract descriptions of the clusters were generated based on the transcripts and annotations and put into context of the ongoing action. Moreover, passages from the interviews that related to the particular identified practices were extracted.

Additionally, we applied a mix of statistical tests to identify relation between DESA or PERS values and observed practices. In those tests we treated the observed practices as independent variables with value 1 if a practice was applied in an advisory session and 0 otherwise. We identified practices, that have influence on the dependent variables: DESA and PERS. We run our tests separately for the IT and non-IT conditions – the reported results can be treated as in a between subject study. Following the above, we chose a set of statistical tests appropriate for identification of dependences between nominal independent variables with two or more levels and continuous (interval) dependent variables (Leeper and Hartman; Kanji 2006). We employed the following tests: two-independent-sample t-test, Kruskal-Wallis test, and multiple regression. This approach allowed for formulation of relevant hypotheses and should be treated as indication of possible directions for future research, but not as ultimate evidence for the reported influence or its direction. In particular, our experiment was not designed to detect them and the fact that some of the practices were or were not applied in the particular sessions is more a matter of chance than a consequence of deliberate experiment design. Here, we report on observations with significance coefficient lower or equal to 0.1 (designated by p).

4 Results

In the following, we report on the observations we made across the very extensive data set obtained in the described experiment. First, we show the practices employed by the advisors in the course of their persuasive activities. In particular, we point to the specific practices that are made available by the proposed technology, show how they fit the advisory session, and compare them to corresponding practices in the non-IT condition. Second, we discuss the collected opinions and statistical data that indicate what practices are beneficial or destructive to the overall persuasive character of the encounter.

4.1 Identifying persuasive practices in home security advisory encounters

Thanks to the very extensive preliminary studies in the context of HS advisory services, we could identify three particular goals that advisors follow in their daily work: First,

they want to offer help that fits homeowner's needs and situation. Second, they want to provide convincing explanations regarding complicated technical features and behavioral issues. Third, they want to bring the persuadee to tackle the discussed issues – they should contact, e.g., local providers of HS hardware, or change their behaviors. During the analysis of the data, we were able to identify practices in each of the three areas – in the following, we shortly characterize them and provide information on their occurrence across our data set (Tables 7, 8, and 9).

Current situation and needs of the homeowner: According to its definition, persuasion aims at changing, reinforcing or shaping new behaviors and attitudes. This may be ineffective, if the current situation or needs of the persuadee remain hidden. Consequently, that advisors try to approach this topic. If one considers the model proposed by Fogg (2009), the work that advisors do while learning to know the homeowner falls into the area of *motivation* – discussing the needs and feelings regarding security makes clear to the persuadee why the encounter takes place and why HS is important.

Practice and its description
Practice 1 – asking: The advisors introduce the topic of HS mostly by simply asking for the reason of the encounter – after a short introduction they simply pose a question. Often, the answer of the customer is not proceeded by any further discussion. Then, the advisor simply moves to the next point on their agenda, mostly reviewing the security features of doors. Practice 1 occurs with the following frequency: *(a) IT 5 times (out of 20)* *(b) non-IT 11 times (out of 20)* In 3 further non-IT cases, not even a single question was asked regarding the homeowner's HS needs.
Practice 2 – discussing: After receiving an answer, the advisor continues on the topic while paraphrasing the answer and, important, asking further questions to additional information instead of simply moving to the next topic being mostly window's or door's hardware. Practice 2 occurs with the following frequency: *(a) IT 15 times (out of 20)* *(b) non-IT 6 times (out of 20)* We speculate that this frequency results from the fact that the tool includes a screen (Figure 13a) where advisor can choose from a set of standard needs to characterize the current situation of the homeowner. Even though the suggestions in the tool are rather general, the accompanying discussions were more extensive than that.
Practice 3 – recording: While or after listening to the homeowner's HS needs, the advisor takes notes of the needs in the tool by choosing respective fields, but does not show to the client what he chooses or touches – the advisor treats the tool as his private device. In the non-IT setting, the advisors did not make any effort to record the information regarding the homeowner's needs. Practice 3 occurs with the following frequency: *(a) IT 9 times (out of 20)* *(b) non-IT no comparable practice*
Practice 4 – collaborative recording: As opposite to the previous situation, here the advisor takes care of involving the client into the recording. This happens by sharing the screen with them and by paraphrasing the needs expressed by the client to fit the descriptions in the tool. Advisors leverage this situation to introduce the tool and explain its role in the advisory session. Practice 4 occurs with the following frequency: *(a) IT 9 times (out of 20)* *(b) non-IT no comparable practice*
Practice 5 – reviewing: The advisor gets back to a particular need or set of needs expressed earlier by the persuadee. This often happens when he presents the final report of the encounter or, in fewer cases, when discusses particular improvement of a security feature. Practice 5 occurs with the following frequency: *(a) IT 10 times (out of 20)* *(b) non-IT 0 times (out of 20)*

Table 7 Persuasive practices related to learning and addressing homeowner's needs

Missing security features: Persuasion is ineffective if the persuadee does not recognize the attitude or behavior she should change to reach her goals. In our particular case, this includes assembling of new security elements for doors and windows, as well as establishing new routines using those security elements (e.g., locking the windows with a to-be-installed lock mechanism as opposed to simply closing them). The work that the advisors do while teaching the new behaviors falls into the area of *ability* according to Fogg's model. We observe a whole range of practices in this context.

Practice and its description
Practice 6 – illustrating through gesture: The advisors explain the flaws of windows and doors directly at the object, while pointing to the particular features (e.g., lock mechanism) and explaining how it may be improved, i.e., how it should look

like and be used in the future. This is a practice that seems to be essential to all advisors and is applied at least several times in the IT and non-IT condition.
Practice 7 – taking picture: The advisor takes picture of the particular object or feature via the camera included in the tool. This practice has two different forms: (1) the advisor takes the picture *alone* while the homeowner goes on the side; (2) the advisor tries to keep the homeowner involved by explaining what he does and maintaining the conversation or by incorporating the persuadee in the process of photo taking (encouraging her to look at the picture being taken). Practice 7 occurs with the following frequency: *(a) alone + IT 17 times (out of 20) (b) together + IT 3 times (out of 20)*
Practice 8 – annotating picture: The advisor adds specific marking to the previously taken picture in form of rough drawings done by touching the screen – such annotations depict particularly weak or strong points of the object in the picture. Again, this practice is done only by the advisor or in collaborative manner with the persuadee. It can only occur in IT condition. Practice 8 occurs with the following frequency: *(a) alone + IT 5 times (out of 20) (b) together + IT 14 times (out of 20)*
Practice 9 – reviewing picture: Advisor reviews the picture and shows it to the homeowner to return to a particular topic from earlier part of the conversation. This typically happens when advisor recapitulates the advisory session, returns to particular object or identifies appropriate solutions to address the issue discussed at the object. This practice occurs only in IT condition; in 18 out of 20 cases.
Practice 10 – adding free text and notes: The advisor adds additional notes or chooses from predefined template notes to denote the problem or the solution related to a particular object. This practice occurs in the IT condition, but can be compared to *Practice 14* from the non-IT case. Nevertheless, *Practice 14* occurs in the late phase of the advisory session, during recapitulation of particular problems and solution. Thanks to the IT, *Practice 10* can occur throughout the service provision – it occurs in 13 out of 20 cases.
Practice 11 – presenting a video: The advisor presents a video illustrating working methods of burglars and how they deal with doors and windows. Advisors introduce the video shortly and then add further explanations or clarifications to the presented material. This practice occurs in 14 out of 20 cases in IT condition.
Practice 12 – presenting a schema: The advisor presents a schema of a technical detail to the persuadee on the IT tool. There are numerous schemas provided in there and they reflect material presented in brochures and other printouts. This practice is the IT-based counterpart of *Practice 13*. It occurs in all 20 IT cases.
Practice 13 – presenting a brochure: The advisor presents a schema of a proposed solution to the persuadee in the brochures and print outs he carries with him. The material includes mostly a technical drawing of the proposed solution. This practice is the paper-based counterpart of *Practice 12*. It occurs in all 20 IT cases.
Practice 14 – annotating a brochure: The advisor adds additional notes and sketches to brochures and print outs. The information he adds to the brochures includes, e.g., information on which window or door it belongs to or what kind of materials can be used in the given context. This practice is the paper-based counterpart of *Practice 11*. It occurs in 10 out of 20 cases – four less than in the IT condition.
Practice 15 – presenting an exhibit: The advisor uses a mechanical example to illustrate how a specific locking mechanism works. In most cases, advisors present difference between mushroom and roller cam in the window fitting while presenting a piece of window hardware. Practice 15 occurs as follows: *(a) IT 2 times (out of 20) (b) non-IT 14 times (out of 20)*

Table 8 Persuasive practices related to presenting security improvements and new routines

Personalized recommendation: Given the presented understanding of persuasion, the practices presented above may be ineffective if the persuadee does not know how to approach the set of proposed changes, i.e., what steps to take to reach her goal. In our particular case, a persuadee needs to know what is obligatory and what is optional, what can be done easily (e.g., on changing insecure behaviors), and what requires more effort (e.g., assembly to be done). If the persuadee is clear about all those points, it becomes a *trigger* (Fogg 2009) to tackle the HS issues. The advisors apply particular practices and employ specific materials to support the triggering effect of the advisory encounter.

Practice and its description
Practice 16 – mentioning the priorities: In general, the advisors suggest upgrading the mechanical security features (windows and doors) before going for electronics (e.g., alarm system). They provide a list of local craftspeople who are certified to make specific improvements. After making a short utterance about the necessity to contact a respective craftsman, they go over to the next topic. Practice 16 occurs as follows: *(a) IT 20 times (out of 20) (b) non-IT 17 times (out of 20)*
Practice 17 – discussing the priorities: After mentioning the general priorities, the advisor discusses them with the homeowner to make sure that they fit her expectations. As opposite to *Practice 16*, here additional questions are asked and the advisor makes sure that the homeowner understood the general tendency in this regard. Practice 17 occurs with the following frequency: *(a) IT 17 times (out of 20) (b) non-IT 3 times (out of 20)*

Practice 18 – listing things to be done: The advisor writes down and provides a list of things and issues to be addressed. The list does not give any priority to one or the other problem or solution, but summarizes all topics addressed throughout the provision of the service in a predefined order (door, windows, cellar, etc.). Alternatively, the respective information is written on the brochures or print outs. Practice 18 is characteristic for the non-IT condition and is applied there in 12 cases. In two cases (out of those 12), the advisor places the list between him and the persuadee, such that the notes were made collaboratively.
Practice 19 – prioritizing things to be done: The advisor lists all issues to be addressed and orders them according to the priorities and his personal assessment. This practice is supported by the provided IT and occurs only in the IT condition: the advisor can sort all issues he addressed according to the dimensions of priority and time. In most cases, he encourages the involvement of the persuadee such that the prioritizing has a collaborative character. Practice 19 occurs with the following frequency: *(a) alone + IT 6 times (out of 20)* *(b) together + IT 13 times (out of 20)*

Table 9 Persuasive practices related to informing about the next necessary steps

The identified practices occur across the whole data set and do not show coincidence with the particular advisors or do not result from order effects. However, they are interrelated. Collaboratively visualizing things (like in *Practice 19* and *Practice 4*) imply more extensive discussions (*Practice 17* and *Practice 2*). Some practices are related to the material used and address the visualization of content (*Practices 3, 4, 7-15, 18, 19*), others are conversational practices (*Practices 1, 2, 5, 6, 16, 17*). It is, thou, obvious that this division is not binary – especially the collaborative practices, rely on visualization as a common artifact as a basis for conversation (e.g., *Practice 4, 5, 7, 8, 9, 19*).

4.2 Relating persuasive practices to the perceptions of the persuadee

The above analysis shows that supporting visualization of specific content enables for occurrence of particular conversational and interactional practices. Nevertheless, the effectiveness of the practices cannot be solely related to their occurrence in the advisory encounter. In the following, we discuss the relation between PERS and DESA, as well as the relation between the occurrence of particular practices and those two measures.

Relation DESA – PERS: DESA and PERS stand in relation to each other and both define important aspects of persuadee experience in persuasion regarding health behavior as measured by a general, online survey (Lehto et al. 2012). Our analysis confirms this for the situation of HS advisory service, by using an onsite survey right after the these sessions. There is a significant and moderate-to-strong correlation between DESA and PERS across all our cases (two-tiled bivariate correlation: Pearson's Coefficient $corr = 0.5, p \leq 0.001$) and, especially, in the non-IT cases ($corr = 0.6, p \leq 0.005$). The coefficient we measure is higher than reported in earlier research (0.43 (Lehto et al. 2012)). Furthermore, we show that DESA is significantly higher in the IT condition than in the non-IT with a large effect size (IT: $\bar{x} = 4.72$; non-IT: $\bar{x} = 3.95$; $t(19) = 3.29, p \leq 0.005$), and, as consequence, PERS is higher in the IT than in the non-IT with a very small effect size (IT: $\bar{x} = 4.71$; non-IT $\bar{x} = 4.58$; $t(19) = 1.05, p \leq 0.1$). We do not observe significant results for other constructs from the model of Lehto et al. (2012).

Influence of practices on PERS and DESA: When asked about the most positive episode across both conditions or about the what increased their understanding, many persuadees point to the visualization potential of the IT – for video: *"I valued the fact, that one could directly show me how a potential burglary can look like"* [H13] and for pictures: *"Schemata made it easy to understand the technical solution – they were good in traditional advisory as well as in the modern one – just with the tablet you could directly see it at the object"* [H16]. The visualization potential of modern technologies was emphasized in each interview. In particular, persuadees point to videos and schemata as elements that leverage understanding (*"It was a lot easier to understand the one [advisory session] where I could see the video and pictures"* [H8]), and the practice of recording needs as a way to personalize and

individualize the advisory service (*"It was a personalized experience – he addressed my personal situation. One feels respected if their personal situation gets considered. One feels proud"* [H2]).

Asked about their motivation and ability to take next steps on HS, persuadees point to the prioritization practices: *"This was clearer in the IT, because one could see what to do next and what can wait"* [H16]. Some other account for the role of individualized pictures: *"I found the one with tablet more pleasant cause there was a through and individualized discussion towards the end (…). I could take this PDF with the photos of my doors and windows, and go to the craftsman, show this to him and ask for his help"* [H15]. Other persuadees emphasize the role of discussion in general: *"The conversation at the closure, it encouraged me and acts as a reminder of most important things – independent of whether with IT or not"* [H8]. The collaborative character of activities seems to be very central issue for many test participants: *"It helped to understand when we took the picture together. Clack… 'Look, there is your door'."* [H9] and *"So, my advisor, she took the pictures, added markings, made notes with me. And I think, those photos help to remind oneself of what needs to be done"* [H18].

On the one hand, the persuadees refer to particular materials used throughout the advisory sessions: schemata, videos, pictures, etc. On the other hand, they stress the interactional and conversational character of advisory sessions. We explore this issue while providing results of statistical dependence analysis of the PERS and DESA measures and the observed practices. We did not identify any (nearly) significant relation between practices and PERS or DESA for the non-IT condition. All the indications presented below describe solely the IT condition in a between subject mode.

The results of the Kruskal-Wallis test suggest a positive relation between Practice 2 (discussion of homeowner needs) and DESA ($H(1) = 2.53, p \leq 0.1$), as well as between Practice 19-b (prioritizing things to be done – together with IT) and DESA ($H(1) = 4.24, p \leq 0.05$). We also observe negative relation between Practice 7-a (taking picture – alone with IT) and DESA ($H(1) = -3.33, p \leq 0.1$) and between Practice 7-a and PERS ($H(1) = -2.46, p \leq 0.1$). Regression analysis, even if it does not produce a general regression equation for DESA or PERS, it still provides indications that confirm two dependencies: the positive relation between Practice 19-b and DESA ($B = 1.56, t = 2.91, p = 0.04$), as well as the negative one between Practice 7-a and PERS ($B = -0.8, t = -1.8, p \leq 0.1$). Finally, the set of two-independent-sample t-tests suggests the following positive relationships: (1) between presenting the video to the persuadee (Practice 11) and PERS ($t(17) = 1.66, p \leq 0.1$), (2) between collaborative annotation of the picture (Practice 8-b) and PERS ($t(18) = 1.64, p \leq 0.1$), and (3) between Practice 19-b and DESA ($t(17) = 1.66, p \leq 0.1$). In summary, only the relation between Practice 19-b and DESA was yielded in all tests, which seems an intuitive and still valuable – collaborative work practices with a shared visualization improve the perceived design aesthetics of the HS session. The other tendencies we observe confirm that practices which have a collaborative character (discussion, working together with the tool) may tend to improve perceptions on PERS and DESA, while avoiding engagement in collaborative practices may lead to negative effects in this regard.

5 Discussion and Conclusion

Our analysis shows that advisors employ a whole range of persuasive practices. They differ with regard to use of artifacts (IT, brochures, etc.) and with regard to their collaborative character. Also, some practices address the homeowner's HS needs and the

next steps, however the largest variety of practices is employed for addressing the persuadee's *ability* by discussing missing security features. The advisors put by far most effort to support these activities by using brochures, exhibits, and referring to windows and doors. With introduction of IT, new relevant practices emerge, such as: collaborative picture taking or video watching. Practices that improve persuasive character of the encounter involve collaboration and discussion around a shared artifact – according to the interview data and the quantitative analysis of survey responses. Importantly, IT improves design aesthetics (DESA), but has negligible effect on persuasiveness (PERS) as shown by comparison between conditions. Consequently, it is not the technology itself that enhances persuasiveness in HS encounters, but the way it is used makes the difference. In our opinion this is the key for further research in the area of PT for interpersonal interaction where successful persuasion is essential.

Hitherto, the focus of research in PT was on the human-computer influence, as well as computer-mediated and computer-moderated interpersonal influence (Stibe 2015). The results suggest, that technology designed along the same lines has potential to establish effective practices for face-to-face interpersonal influence – in particular it shows that specific practices can easily emerge and supplement existing practices if appropriate IT is provided. We show that PT can be well applied in situations where a human persuader is needed due to the high complexity of decisions to be taken, as opposite to more classical application scenarios with a clear target state or behavior (Arroyo et al. 2005; Rogers 2006). This opens a new, fascinating area for PT researchers and shows first directions of research: establishing persuasive practices as work practices between persuader and persuadee.

In the course of generalizing our observations, it is easy to imagine that systems like the one used in current study, can be effortlessly extended in accordance with other design principles borrowed from PT. In the case of HS, this includes information on the improvements done by other people in similar situation and their attitude. We argue that PT community needs to extend its research focus beyond this limit (Rogers 2006) – it is easy to speculate about possible direction of research, e.g., health support apps where computer-mediated or -moderated persuasive systems are linked with advisory services at doctor's office. Through the design and application of the tool presented above, we show that the guidance developed for the computer-human influence (Fogg 2009) is applicable for interpersonal encounters. Our research, also, contributes to the knowledge on IT support in advisory services. So far, research in this area addresses concepts as transparency (Nussbaumer et al. 2012) or education (Heinrich et al. 2014b), thus addressing the objectivism of such encounters. However, considering persuasion in this context stresses a different side of those encounters being a meeting of two socially and organizationally linked actors following their goals. The identification of relevant persuasive practices helps the designers to engineer systems inducing those practices and the researcher to identify design elements linked with persuasion and differentiate them from features for facilitation or moderation.

Finally, the set of collaborative practices identified via statistical tests as having potentially strong influence on persuasiveness confirms the importance of practice-based studies for the PT. While following the general description of practices from the consulting literature (Blundel 2004), we are able to identify particular practices specific in the given context and provide a zoom-in analysis (Nicolini 2012). Thereby we confirm the value of such perspective in the PT research and claim, that it is the appropriate way to study effects, especially in human-human influence scenarios. The results do not come

without limitations: practices perspective focuses on local, internal validity over the external one. Nevertheless, we show its potential for research in PT to explore human-human influence in IT-supported encounters and claim that the results can be adopted in other scenarios, such as medical advice – doctor who fails to convince a patient via words, could, e.g., employ videos showing negative impact of particular factor on the patient's body. We call for intensification of research oriented at practices resulting from use of PT in real situations and for deepening the understanding of persuasive practices. Alike in general HCI, we call for practice-turn in PT research (Kuutti and Bannon 2014): What other persuasive practices emerge? Which of them can be supported by PT? How to design appropriate PT?

PAPER VI

Involvement Practices in Persuasive Service Encounters: The Case of Home Security Advice

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Abstract
Advisors providing non-commercial service encounters are neither trained nor explicitly incentivized to persuade the advisee. However, a whole range of encounters may benefit from enhanced persuasiveness to prevent the advisee from taking counterproductive decisions. Persuasion literature from the field of social psychology points to the persuadee's involvement as a central factor of persuasive effect. Nevertheless, little is known on how persuader addresses persuadee's involvement and how those efforts can be supported by means of modern technology, especially in the non-commercial service encounters. Based on a detailed analysis of experimental service encounters and supported by the *in situ* studies of real advisory sessions, this study identifies a set of involvement practices, i.e., conversational practices that advisors engage in when trying to improve the advisee's involvement and illustrates how these practices can be afforded with modern multimedia technology. Thereby, the manuscript proposes to bridge the notions of involvement from the conversation studies and from the persuasion literature. By pointing to the influence of IT on persuasive behaviour in service encounters, it brings together the concept of persuasive technology and service support as a subfield of IS. The manuscript offers novel perspective for framing the conversations and the practices in service encounters.

1 Introduction

Non-commercial service encounters, including doctor-patient, teacher-student, or home security advisory encounters, often benefit from enhanced persuasiveness (Swindell et al. 2010; Dubov 2015). Advisors, who provide such encounters, are not explicitly trained to persuade the advisees, as opposite to sales personnel in commercial service encounters, who receive dedicated training on selling. Nevertheless, advisors in non-commercial encounters intuitively engage a range of practices, which enhance the persuasive character of the encounter – they engage in persuasive practices (Dolata et al. 2016): they address advisee's emotions, discuss reasons for the participation in the advisory service, or suggest next steps to follow upon the advisory encounter. Among others, they often address advisee's *involvement*, i.e., the advisee's engagement in the ongoing interaction as a product of her[4] perception on the personal relevance of the issue under consideration and her potential impact thereon (Petty and Cacioppo 1986a). Involvement has been traditionally presented as one of the central antecedents of persuasion effect in direct communication (Petty and Cacioppo 1986b, a; Johnson and Eagly 1989). This study aims at the identification of involvement-related persuasive practices while following a multi-method approach using observations of real, in-situ interaction and video-recording of realistic home security advisory encounters. Therein, a policeman visits people at their homes to provide advice on how to secure their property against burglary. Since only a fraction of the advice provided in such encounters gets implemented by the advisees, enhancing the persuasiveness of the encounters has an essential, practical relevance. Recently, the policemen observed in the current study have been equipped with modern tablet PCs running a dedicated application that gives them easy access to the multimedia features of the tablet for use during their encounters (e.g., capturing pictures, playing videos, showing relevant illustrations, on-the-go note taking). The current study reports on the routines advisors employ to maintain the advisee's involvement and discusses how those routines alter due to the introduction of the IT.

Various life situations make people seek external help to understand and frame their standpoint and to specify an adequate course of action. They look for external advice and engage in advisory service encounters, i.e., voluntary meetings with service providers, to receive guidance and recommendation on how to approach a particular issue. From this perspective, an advisory service encounter can be seen as a collaborative, problem-solving process between the service provider and an advisee (Schwabe et al. 2016). This definition embraces such situations as doctor-patient or teacher-student encounters, nutrition counselling, and home security advice. Often, a service encounter is just the beginning of a complex decision process: thereafter, the advisee decides on whether to tackle the issue under consideration (e.g., to fight or not to fight the obesity) or which solution to choose (e.g., exercise therapy or diet). Obviously, not all applicable solutions lead to the same effects – in fact, advisees were shown to take counterproductive decisions given their declared goals (Klein and Stefanek 2007) and to discount the received advice (Yaniv and Kleinberger 2000; Tzioti 2010). To prevent an advisee from contravening her long-term goals, it may be in her best interest to *persuade* her to take a specific course of action (Swindell et al. 2010; Dubov 2015). Effective persuasion can prevent the advisee from taking decisions based on detrimental biases and heuristics, which value quick wins over long-term enhancement and prejudice over new information (Chaiken 1987).

[4] Throughout the manuscript, we refer to the advisor as a male (he, his) and to the advisee as a female (she, her). This shall guarantee for an equal distribution of both gender forms in the paper, while securing the clarity and simplicity of the text.

Consequently, we claim that most advisory encounters embrace a persuasive as well as problem-solving elements – we refer to them as persuasive service encounters.

Persuasion during a service encounter is neither an easy nor an uncontroversial topic. There exist commercial service encounters conducted by sales personnel who is incentivized and trained to persuade the client (e.g., investment advice at a bank) – persuasion and sales-orientation dominates over the actual problem-solving in such encounters, which has already been criticized (Geiger and Kelly 2014). However, a whole range of encounters are conducted by domain experts acting as advisors, such as doctors or policemen. They are neither prepared nor externally incentivized to convince the advisee to anything. Additionally, as official representatives, they are expected to be unbiased in their opinion and to act accordingly (Dubov 2015). In fact, if the advisee develops the feeling of being in a sales encounter, the risk of falling back to the ineffective heuristics may rise (Swindell et al. 2010). Consequently, persuasive practices in this category of non-commercial persuasive service encounters will have a different nature than in the traditional sales encounters. Consequently, understanding how advisors ensure that the advisee engages in the examination of the issue and the potential solution may open opportunities for design efforts oriented at the persuasiveness in non-commercial encounters.

Involvement has been long identified as one of the central antecedents of persuasiveness in direct communication (Johnson and Eagly 1989). At the same time, it is an important variable describing interpersonal interaction (Coker and Burgoon 1987) – perceived involvement of one interaction partner rules the behaviour of the others (Burgoon et al. 1999). In a persuasive service encounter, an optimal level of involvement allows the advisee to systematically process the issue- and consequence-related merits of the recommendation (Petty and Cacioppo 1986a; Chaiken 1987). If the advisee is not involved, she may fall back to heuristics, biases, and prejudice (Chaiken 1987). This paper builds upon the claim, that the advisors, even if not trained to persuade, identify and react to the missing involvement in the advisees. Thereby, they moderate the persuasion success and the advisee's subsequent actions (Petty and Cacioppo 1986b; Johnson and Eagly 1989). Nevertheless, we miss a comprehensive description of practices employed by the advisors to address advisee's involvement. Consequently, we ask:
What involvement practices do advisors engage in when using an IT system equipped with multimedia?

Answering this question shall help the designers and engineers in the field of service encounters: they will benefit from insights into the essence of persuasion in IT-supported encounters and will learn how various features of the IT, including the multimedia, can be employed to engineer the interaction between the advisor and the advisee to become particularly involving. Also, the study contributes to the traditional, qualitative-behavioural IS research on adoption and appropriation of technology, while showing how specific media gets appropriated by practitioners in their daily work environment and presents a case explicating how functionalities and features of IT can be employed to induce specific practices. In a broader sense, this research aims at building a bridge from the areas of persuasive technology and persuasion support to the IS community while pointing to novel research opportunities.

2 Related Work

2.1 Involvement in Persuasion

Persuasion has been extensively studied in the field of psychology leading to several models. Information-processing models characterize persuasion from the perspective of persuadee (Chaiken 1980, 1987; Petty and Cacioppo 1986a): If the persuadee processes the true merits of the information, while considering consequences of a decision, systematic information processing (Chaiken 1980) and elaboration (Petty and Cacioppo 1986a) take place. If the persuadee relies on prejudice, peripheral cues, and simplistic biases, heuristic information processing dominates (Chaiken 1980, 1987). Principally, systematic and heuristic processing are better or worse depending on situation (Chaiken 1980). In a service encounter where a domain expert meets a layperson, the advisee will benefit from focused consideration of the arguments and information provided by the advisor. Consequently, this study claims that persuasion resulting from elaboration (Petty and Cacioppo 1986a) better fits the model of a service encounter.

Three dimensions delineate the systematic and heuristic processing, they are: the persuadee's ability to produce a response (i.e., take a decision or make a statement in the conversation), the opportunity to respond, and the persuadee's motivation to respond (Petty and Cacioppo 1986a; Chaiken 1987). *Ability* describes persuadee's knowledge about the issue under consideration and her ability to produce an informed response (Batra and Ray 1986). *Opportunity to respond* defines whether the persuadee is anyhow limited to make a response (Batra and Ray 1986). Finally, *motivation* describes the extent to which a persuadee has the feeling that the issues under consideration are important (Batra and Ray 1986; Petty and Cacioppo 1986a; Chaiken 1987). If the ability, opportunity, and motivation to respond are in suboptimal states, the persuadee will follow heuristic path and will not provide an elaborated response. While the above models originate from the 1980-ies, they are considered an accurate description of the persuasion effort and are cited, among others, in IS literature (Oinas-Kukkonen and Harjumaa 2009). However, as the models evolve, new criticism emerges (Petty et al. 1993; Petty 2013).

If the persuadee exhibits involvement with the issue, her motivation increases and she is more likely to engage in systematic processing of the information. In the context of persuasion, involvement has been defined as a person's engagement in the ongoing interaction as a product of her perception on the personal relevance of the issue under consideration and her potential impact thereon (Petty and Cacioppo 1986a). The involvement rises if (1) the persuadee has the feeling that the issue under consideration has particular, personal importance to her (personal involvement) and if (2) the persuadee sees her response as impactful to her, her environment and other parties (response involvement) (Chaiken 1987). While psychology studies involvement in information processing, they hardly ever approach this as a communicational resource. One can rhetorically ask: how do persuaders address the involvement of the persuadees? What practices are successful in this regard and how they can be supported by means of IT?

2.2 Involvement in Communication

Whereas psychology discovered involvement as an antecedent of systematic processing in persuasion, communication science has studied involvement for decades and puts in positive relation with cooperation and convention sharing (Gumperz 1982), positive emotions (Warner et al. 1987), and credibility (Burgoon et al. 2001). Furthermore, receivers (listeners or readers) who exhibit strong involvement, achieve greater understanding than

passive observers, such as eavesdroppers or over-hearers, despite access to the same information (Krauss and Fussell 1990). This resembles the positive nature of involvement as presented in persuasion models (Chaiken 1980): the more involved the listener, the higher the chance of systematic processing of received information.

Communication sciences define *involvement*, generally, as a sense of presence, of "here and now" in an interaction (Burgoon et al. 2000). However, existing concepts stress various aspects of involvement and frame it in a whole variety of ways: as a personality trait (Cegala 1981), as an attribute of a situation (Burgoon et al. 2000, 2002), or as an individual or a group characteristics (Burgoon et al. 2000, 2002; Oertel 2013). This paper chooses a conceptualization which overlaps with the notion of involvement in persuasion: it treats *involvement* as a situation-dependent characteristic of the advisee, which may vary during an interaction and reflects her current mental stance towards the interaction. Changes of involvement get (un)intentionally expressed through a variety of verbal and non-verbal micro-behaviours: proximity, gesticulation, pitch and intonation, eye gaze, wording, pacifying behaviours, intention cues, etc. (Mehrabian 1971; Burgoon et al. 2000). While the communication studies describe the nature and effect of involvement in conversation, they pay little attention to involvement as a situational, context-dependent characteristic. Questions arise: how do tools used by one person influence the involvement of the other? how does involvement occur in an interaction between two humans and a computer?

2.3 Home Security Advisory Encounters and Technology

Communities fear burglary and demand effective protection of their properties. Public authorities have interest in making their municipalities more secure and establish units for burglary prevention: Policemen, equipped with the necessary technical know-how on home security, visit homeowners at their properties and inform them on methods to improve the home security through specific upgrades on windows, doors, lightning, or alarms. The service has existed for years, but the authorities see modern IT as opportunity to improve the quality of the service through, e.g., personalized and persistent documentation for the homeowners or through use of multimedia to support information transfer (Giesbrecht et al. 2015; Comes and Schwabe 2016a; Schwabe et al. 2016). Since the authorities estimate that only 20-30% of the recommendation gets utilized by the homeowners (Schwabe et al. 2016), IT has been also considered a way to improve the persuasiveness of the encounters: the advisors are not trained to persuade the homeowners, but focus on status-quo's assessment and information provision. A recent study shows how IT may enable and enhance a set of some general persuasive practices in face-to-face interaction (Dolata et al. 2016). Still, we know little about hot to improve persuasion with IT.

Going beyond the case of home security advisory encounters, the literature provides a more comprehensive picture on the role of IT in persuasion. In particular, the community gathered around the concept of *persuasive technology* (PT) has worked extensively on designing tools to persuade people, i.e., to change their behaviour or attitude (Fogg 2009). Their design studies focus, primarily, on direct influence between a computer and a human, as well as computer-mediated and computer-moderated influence between humans distributed across space and time (Stibe 2015). Despite recent tries to leverage those results to support persuasion in conversation between humans (Dolata et al. 2016), PT still lacks commitment and consideration of the case where two people collaborate in a face-to-face setting. Also studies on persuasion which originate in

the community of IS (Kaptein 2011; Yu et al. 2011; Lehto et al. 2012) or computer-supported cooperative work - CSCW (Baumer et al. 2012; Fritz et al. 2014) omit the topic of persuasion in the most natural, conversational setting. This study addresses a central feature of the natural conversation, the involvement, which essentially influences the effect of persuasion.

3 Methodology

The current study forms a specific part of a research program established as a collaboration between police authorities in parts of Germany and Switzerland and the authors' institute. The goal of the research program was to improve the quality and effectiveness of the home security advisory service: the idea was to develop and roll-out a dedicated prototype system to support the home security advisors during their routine advisory sessions. By now, we can report on the successful completion of the project: 16 different advisors used the prototype for at least 4 months up to 2 years in the pilot phase – it got applied in overall 1250 advisory sessions. A working system which uses the design and interaction concept of the prototype will be shortly rolled out to the whole of Switzerland and parts of Germany. During the project, we were shadowing the advisors before the development and during the pilot phase, we conducted multiple workshops, and collected their feedback in formal and informal settings. We, also, ran several evaluation tests to record realistic advisory sessions and collect opinions from the advisors and potential advisees. Overall, the data backing up the current study has multimodal character and was collected in various settings including direct observation, feedback rounds, workshops, etc.

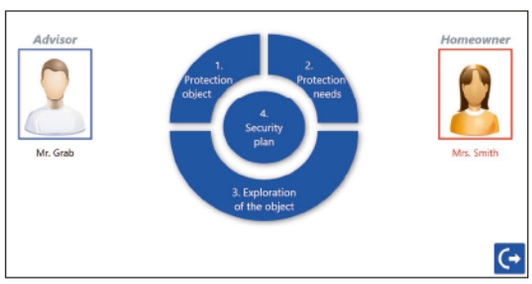
This paper focuses on the basic level of the activities conducted by the advisors – the conversational practices and resources. This goes in line with the practice-turn in HCI research (Kuutti and Bannon 2014). Practice-oriented research discusses how, why, and where practices get applied (Nicolini 2012). We focus on practices applied on the conversational level, in the talk-in-interaction, but see conversation as a multimodal happening involving use of mediational resources. Consequently, to respect the multimodal and object-dependent nature of conversation (Wooffitt 2005; Nicolini 2012), we choose a method based on mediated discourse analysis (Scollon 2001; LeVine and Scollon 2004) that proposes to use single actions as units of analysis for the study media and technology use in human-to-human interaction. According to Scollon (2001), practices define the milieu of actions and describe types of actions, that singular actions share in and intersect with. Humans directly and routinely engage in practices but do not attend to them in an analytical, conscious manner (Mortensen 2012; Nicolini 2012). Consequently, while studying conversation as a set of singular actions, we aim at identifying routines advisors intuitively engage in to maintain the involvement of the advisees.

To study the ongoing interaction, we focus on two data sets originating from the research collaboration with the authorities mentioned above. The first data set comprises 24 videos of advisory encounters collected during evaluation experiments (Mettler et al. 2014) – this is the main source of knowledge. The second data set comprises notes and recordings collected during observation of 24 real home security advisory sessions conducted by 9 different home security advisors – this is the supporting source of knowledge for the current study. While the main data was used to elicit and describe the

practices, observations from the real encounters confirms that the practices exist and no other involvement practices were found in the field.

3.1 SmartProtector

We call the IT system developed during the research program with authorities in Switzerland and Germany SmartProtector. We designed the tool in a user-centred process under consideration of the requirements from the authorities, advisors, and the advisees. For us, researchers, it was important to keep the high rating of the service and the advisee's satisfaction comparable to the previous, pen-and-paper setting. Therefore, we wanted to enable for as natural conversations as possible. At the same time, SmartProtector shall support the advisor at persuading the client through provision of additional, externalized information and multimedia and by supporting individual problem and solution finding. Comes and Schwabe (2016b) describe the design rationale and the detail of the resulting system.

(a) 

(b) 

Figure 14 Exemplary screens from the SmartProtector: process (a), marking of weak points (b).

As presented in Figure 14a, the process implemented in the tool follows the conventional practice – it consists of four steps, but there are no constraints that enforce the order of steps. Figure 14b exemplifies how multimedia features were used to individualize the process: with the SmartProtector, the advisor can take a picture and seamlessly mark important points thereon. The tool gives access to brochures and print-outs advisors know. The software was deployed on a 10" MS Windows tablet and put in a solid case with a bend such that it was easy to carry around the device and to hold it while gesticulating.

3.2 Main Data – Collection and Analysis

As a main data we use video recordings of advisory sessions collected during the evaluation of SmartProtector, i.e., it is experimental data generated and collected in a simulated environment. This data was then used in accordance with secondary data analysis rules for design research (Dolata et al. 2015) to study behavioural conduct of the service encounter participants as described below. During the experiment, we put much effort in making the setting as realistic as possible: The advisors were policemen who provide home security advisory services as part of their normal work. The advisees were a convenience sample acquired through different channels such as social media – their age, status, and gender varied; they received inexpensive gifts (approx. 10 USD), beverages and meals on the day of their participation. The experimental advisory sessions took place at a pre-fabricated houses exposition: the houses presented in there reflect the housing standards in central Europe. We run a realistic, consistent scenario during the experiment: The advisees were asked to put oneself in a position of a homebuyer who visits two different houses with a home security advisor to receive advice on how to make

their future property more secure. No advisor and no advisee visited the same property twice. Overall, 12 advisees and 6 advisors participated in the experiment. Each advisee participated in two advisory sessions provided by the same advisor: one supported with the SmartProtector and one conventional. Each advisor advised two different advisees. We alternated the conditions order to prevent any order effects. The experiment took place in March 2015, in Germany, on three consecutive days.

The turn-by-turn analysis of verbal and non-verbal conduct relies on selected episodes including a sequence where the advisee first gets visibly dis-involved and then involved again. To identify such episodes, all recordings in their full length were annotated with involvement-information: A trained helper, who did not participate in the experiment, used video annotation software ELAN (Brugman and Russel 2004) to encode information on the advisee's involvement based on the non-verbal cues such as: pacifying and discomfort behaviours, intention cues, and proxemic behaviours (Navarro and Karlins 2008). A sample containing 20% of the so encoded data was discussed with two supervising researchers in a workshop to guarantee for consistency of coding and internal validity. Importantly, involvement coding by an observer is well accepted in the involvement research (Coker and Burgoon 1987). In the current study, the procedure deals solely as a selection criterion for the relevant episodes: namely, the ones where a significant, visible drop in involvement (signalized by a set of minimum four negative behaviours and cues on the advisee's side) and a visible rise in involvement occurred within a five-minute period. Based on these heuristics, we identified 72 potentially interesting episodes. Each episode was transcribed and annotated. The annotation includes all actions conducted by the conversation partners, with special focus on the gesticulation, mimics, use of artefacts, pitch, and eye gaze. In the results section we present a representative set of excerpts from the annotated data annotated according to the standard notation known from conversation analysis (Jefferson 2004). We followed the three-step analysis process (Hutchby and Wooffitt 1998) to approach the transcripts in a CA-like manner: we identified regularities occurring across the whole set, formally described them, and revised them according to the data.

3.3 Supporting Data – Collection and Analysis

To triangulate the observations, we conduct additional analysis of notes and partial recordings collected in real advisory sessions. Full recordings were not possible for security reasons: such a recording would include lots of private details and information about the weaknesses of the house. All real sessions were conducted by policemen who provide advisory service on the daily basis. The advisees who participated in those encounters were real homeowners, who requested a home security advisory service at their home. The researchers had no influence on the selection of the advisees, the homes, or the time and date of the service. In fact, in style of a workplace study (Luff et al. 2000), a researcher followed the advisors throughout the day, while taking notes and recording parts of the formal and informal communication after agreement from the advisors. This data was collected in June and August 2016. During that time, the observer participated in 24 advisory sessions conducted by nine various advisors in Germany and Switzerland – in 22 cases the advisor used the SmartProtector. All nine advisors who participated in the study had essential experience with the tool: they had used it for at least 2 months and had conducted at least 10 (but normally many more – up to 100) advisory sessions with it before the observation. The notes included details regarding the conversational practices of the advisors and the advisees – special attention was paid to signs of disinterest (in a

single case, the advisee even left the room for a moment) and to the reaction of the advisors thereon. The analysis of the notes was oriented at the reconstruction of those situations and their comparison with the practices identified in the main data.

4 Results

In line with the mediated discourse analysis (Scollon 2001), our observations rely on excerpts transcribed in a very exact manner. As non-verbal communication is crucial for involvement-related cues, we include extensive comments on the behaviour of the involved parties: the homeowner (H) and the advisor (A). We use standard written rather than phonetic representation of words. Still we provide information on pauses ("(.)", "(0.8)"), absence of pauses ("=="), long vowels ("wo:rd"), strong emphasis ("word"), loudness ("WORD"), and overlapping speech ("[word"). Due to the page limits we do not provide full transcripts in German – instead, for each episode, we provide excerpts translated to English. We provide a translation that is as adequate as possible, thus leading to constructions that may be ungrammatical in English. In the commentary, we describe the identified practices and assign them codes (PN). Overall, the presentation of the results follows standards applied and widely accepted in the CA community in linguistics, communication sciences, and in sociology (Hutchby and Wooffitt 1998; Gülich et al. 2008; Mondada 2012; Svinhufvud and Vehviläinen 2013).

4.1 Episode 1: Conventional Advisory Session

In the first episode, we encounter a quite active homeowner and an advisor who is known for being an expert of mechanical issues. We join the participants directly after the advisor has inspected the main door to the building. During the inspection, he looks at particular elements of the door and the doorway: door hinges, locking mechanism, and materials used and counts numerous things that could be done.

((A comes in through the door into the house while looking at the doorway left and right; H supports herself by leaning towards the open door))
1 A: **one could do that (.) and then you would get the door (.) in a good sha[pe**
2 H: **[mhm**
3 A: **of course we must now also look [at the door**
4 H: **[at the windows [we must look**
5→ A: **[we will arrive at [it**
6 H: **[yeah**
(0.8)
((A closes the door while looking at it; H moves back))
7 A: **it is important at this door (.) too (.) that you lock it (.) thats actually the alpha and omega of doo: (.) of this [door**
8 H: **[when I'm at home (.) key inside and turn?**
((A moves while looking at H, A nods; H stands in the same place, makes a short gesture and wrings her hands on the torso))
9 A: **Normally yes (.) Because we do have to look (.) This door here has indeed a [latch bolt**
10 H: **[mhm**
((A opens the door uses his right hand to manipulate the latch bolt of the door and his left hand to press down the handle – it causes a mechanic sound from the door; A leans forward and looks down at the locking mechanism; H stands in the back and looks at A))
11 A: **and this latch bolt hooks practically in the striker plate here**
12 H: **mhm**
(0.6)
13 A: **now I will try something (.) ZACK (.) so: (1.0) now it's open**
((A leans forward, very subtly presses the handle; H stands with crossed armes tightly gripping the arms and observes A and the handle))

The above excerpt shows how the homeowner's involvement breaks down – while she adds some words to what the advisor is saying, the non-verbal signs signalize dis-involvement – she normally gesticulates actively while talking and mostly stands with open hands. Here, especially after the somehow strict reaction of the advisor at line 5 (i.e., that they will move to discussing the windows later), the homeowner physically signals dis-involvement: she moves back, wrings her hands and, finally, crosses arms on the chest.

The following sequence occurs: (1) advisor focuses on an object (door) and (probably unintentionally) discourages the homeowner to contribute, (2) homeowner exhibits signs of dis-involvement, and (3) advisor realizes it and makes efforts to repair her involvement. In lines 11-13 the advisor tries to make the technical details interesting to the homeowner, i.e., establish it as the common object of interest (P2) despite constantly referring to it (P1). At first it does not change much in the advisee's non-verbal behaviour. Advisor starts telling a story with a prominent role of the homeowner (P5) – in doing so, he focuses again on the personal relevance of the issue. However, this also does not have an effect:

20 A: **if there's now an offender (0.4) let's assume (.) you are in bed because you're tired or a bit sick=**
21 H: **mhm**
((H nods while looking down at the door, posture as before; A gesticulates with both hands))
22 A: **=and lie down an hour or two**

The advisor repeats the attempts in the next turns and after opening and closing the door a few times, knocking on it, and gesticulating with both hands, he eventually reaches the goal and repairs the involvement of the homeowner:

32 A: **That's why one should [always remove the key**
33 H: **[lock up then**
34 A: **one has to always double-turn the key that is important (.) that the locks extend the bolt correctly**
[and hook in
35 H: **[ye:s understand**
(0.4)
((A gesticulates and imitates the movement of latches that move into a strike plate; H moves his head up and looks at A while nodding))
36 A: **only then they can really give security [to you**
37 H: **[yea:h**
(1.0)
38→ H: **and the key is also important (.) that one pulls it out (.) if somebody (0.8) so if my wife comes back home (.) I have locked (.)**
((H gesticulates with both hands, imitates the movement of locking the door and keeps eye gaze with A; A nods very intensely, looks shortly at the door, then back at H; A smiles and nods, then continues the topic))
39 H: **then she stands in front of the door (0.6) and so she has the possibility to unlock and get in**

In the above excerpt one sees a practice that occurs many times across the data set – the advisor imitates a movement, a non-present event with his hands (P3) – alike pantomime. In doing so, he illustrates what may change if the advisee responds properly to the advisor's persuasion and takes respective actions after the encounter – this stresses the relevance of advisee's response and supports response involvement. Interestingly, in line 38 the advisee actually adds to the story the advisor tries to initiate in line 22 and addresses the issue of removing the key mentioned in line 32. Her reaction proves her rising response involvement – she explicates her concerns and her awareness of the consequences her response will have on her and her environment. The involvement of the homeowner rises gradually and requires a lot of effort from the advisor. His smile towards the end of the episode is almost symbolic.

4.2 Episode 2: IT-supported Advisory Session

In this episode, we encounter a very reserved homeowner and an advisor, who clearly wants to involve her into the ongoing conversation. They are at a balcony door.

1→ A: **Here at the balcony doors (1.5) let's call them balcony doors=**
((A interacts with the door and tablet; H looks away))
2 A: **=so there are patio doors here=**
((A feels the lock rods on the door with his right hand and gazes at them, tablet in the left hand; H gazes in the same direction, hands strained in the back))
3 A: **=you come here accordingly (.) you could convert the locking mechanism [into anti-burglary [lock**
4 H: **[mhm [mhm**
(0.5)
5→ A: **Excuse me (.) I am taking a picture as you see (.) of your balcony door**
((A takes picture while talking: holds the device up and clicks, H leans back, looks away for a moment))
(1.2)
6→ A: **Yes (.) of those (0.8) So: (.) there I got the locking points (.) and the differences on it (0.8) Excellent (0.5)**
((A changes his position closer to H, holds the device in front of them so that both can look on the

screen, A uses his finger to make marks on the screen; H looks at A and at the screen, moves her head towards it))

7 A: **Basically (.) this is not [recommended=**
8 H: **[o:ka:y**
9 A: **=and that's [for now better than [nothing**
10 H: **[yes [yeah (.) yesye:**
(1.2)
11 A: **und that's basically the same thing again (.) here (.) of those (.h) of the balcony door (.)**
((A holds the device even higher while H starts talking, then A moves towards the door and touches the handle))
12 H: **Also: [non-locking handle**
13→ A: **[the handle (.) non-locking (.) no drilling protection (.) I could also here (.) [suggest**
14 H: **[mhm**

The above excerpt indicates lessening involvement of the homeowner: looking away, hands strained behind the back, leaning away. We can see two reasons for that: at the beginning the advisor inspects the door (line 1), then he tries to make a record of it on the tablet (line 5). The homeowner tries to send basic signals of interest ("mhm" which she contributes only at transition relevance places, i.e., where transition between speakers would naturally occur), but does not take the opportunity to take her turn at line 4. At line 5 the interaction character changes rapidly: The tablet is positioned in a way such that the homeowner and the advisor can easily see it; they move nearer to each other, and the advisor starts pointing to things on the tablet. The responses of the homeowner become more involved and occur more frequently, in line 12 she even makes an informed contribution on the type of the door handle. Thereafter (not present in the transcript) she asks a complex question and points to and touches the door.

In the above, we can identify a sequence of the following steps: (1) advisor focuses strongly on an object (balcony door) and documentation (tablet), (2) homeowner exhibits signs of dis-involvement, and (3) advisor returns to the homeowner and makes efforts to repair her involvement. In this particular case he applies the following practices: (P6) he establishes a collaboration sequence with the tablet as a common artifact – marking a picture and putting notes, and (P1) he makes a physical reference to a security-relevant feature of the house (= handle; lines 11-12-13). Both practices in this episode address the personal involvement – the advisor turns the door into common work artifact, i.e., something that automatically becomes personally important. In line with that, he stresses the belongingness of the door through direct and possessive pronouns. Interestingly, in the subsequent turns, the advisor employs even more verbal and non-verbal practices to further encourage the involvement of the homeowner: he (P1) makes lots of physical references to the door, and also (P2) exerts work on it while closing, opening it, and knocking on the glass, and (P5) he makes statements that represent a hypothetic course of action:

33 A: **if you'll say (.) Mister Policeman (.) I would also like it he:re (.) Then, there is a suggestion (.) eghm (.) that ground-level elements**

In this case, he again imposes issue relevance on the homeowner and addresses personal involvement. His efforts are successful – the homeowner reacts by trying to take her turn, thus generating a lot of overlapping speech, by various pacifying behaviours (e.g., scratching), intensive gesticulation, and physical reference to the door. Finally, towards the end of the episode, we observe a course of action leading to an intense and very involved conversation.

50 A: **Good (0.6) No:w of course (.) I can show you a video (.) about a burglary**
((Video starts on the screen, video music plays))
((H looks at the screen, nods; A moves the tablet towards the H's face and looks at H))
51→ H: **oh**
52 A: **just (.) how easy it is for many people (.) how one [can break in**
53 H: **[mhm**
54 A: **Over ninety percent of flats and houses are unsecured (.) so burglar-resistant (1.0) you see just with a [screwdri[ver=**
55→ H: **[yeah [ya: YEAH**
56 A: **=accordingly arm[ed**

```
57   H:                  [he=
58→ H: =[has not a big tool at all (.) nay?
59   A:  [he levers (.) he does
60→ A: Could you hear it? (.) it does once [clack=
61   H:                                     [yes yes
   ((H nods while looking at the tablet; the video finishes; H looks up to A; A simulates breaking
   something with his right hand at the door))
62   A: =and the thing is open (.) and so it does not make just (.) clack (.) again but BAMM BAMM BAMM
        (.) he has to be working hard
```

When focusing on the behaviour of the advisor, it stands out that he introduces the activity of video watching pretty straight forward (line 50). When the video starts playing, he is starring at the homeowner, so he can observe her reaction. As there is no comment recorded in the video, but some music for introduction and then only the sounds of burglary, he provides additional information while the video is playing. In particular, he uses a question (line 60) –a rhetoric one, that works as an involvement question. In the last turn, after the video has finished, he builds upon and illustrates how security works (so that it sounds like "BAMM BAMM BAMM" instead of "clack"). In doing so, he stresses the potential impact of the advisee's decision. In summary, in the above excerpt, the advisor employs the following: (P4) involvement question, (P1) physical reference to object of interest, (P3) gesticulation and onomatopoeic words to represent non-present objects or events, (P7) collaborative watching of a multimedia.

If we consider the reactions of the homeowner, the advisor succeeds: the homeowner reacts to the video with an "oh" (line 51) – a sign of "change in his or her locally current state of knowledge, information, orientation or awareness" (Heritage 1984). She intensely confirms what advisor is saying (line 55) and, finally, gets involved in the commenting of the video (line 60). Her body posture changes from leaned away to leaned forward. This is outstanding given her very reserved and cautious baseline.

In those episodes, we can observe how the advisor uses mobile IT as a moderation tool to support his effort of enhancing homeowner's involvement. While those practices can be very effective, not in each relevant episode IT was used. Just to give a gist of statistics: out of 36 episodes considered for the IT-supported advisory sessions, in 12 episodes the device was not used at all (including 3 cases in which the device was even put aside), and in 7 further cases, the device was used simply as documentation support – the advisor took a picture or made notes, but did it integration of the advisee. In those cases, the device was actually contributing to involvement drops, that were later repaired in a conventional way (P1-P5). In 17 further cases, the device was used to repair the advisee's involvement (P6 and P7).

4.3 Summary

Figure 15 summarizes the general involvement repair pattern we observed in the considered episodes. Importantly, while the previously mentioned models of persuasion stress its psychological or personal dimension, this one presents persuasion as a sequential communication process, thus providing a practical view on persuasion (or, particularly, on involvement maintenance in persuasion).

Across the 72 episodes as well as in the data collected during workplace study, we identify 7 major practices that advisors employ for maintaining advisees' involvement during the advisory session:

P1: physically referring to an object of interest
P2: applying physical action to an object of interest
P3: representing non-present objects via gesticulation
P4: asking questions or asking to do something
P5: telling a hypothetical story about the homeowner

P6: collaborative action on media (pictures)
P7: collaborative consumption of media (videos, schemata)

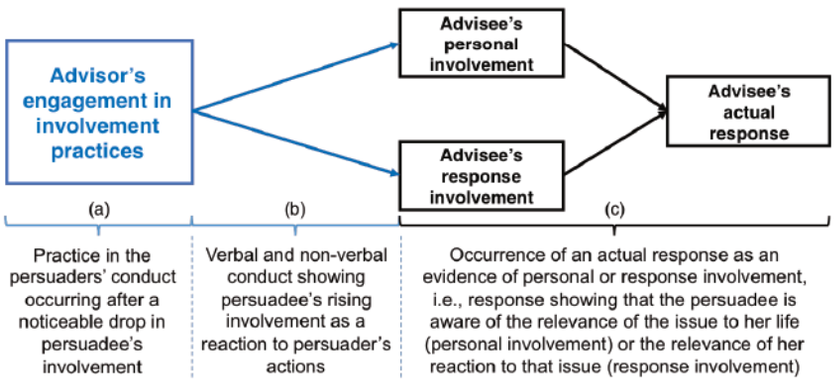


Figure 15 Involvement repair/maintenance sequence: after a noticeable drop in advisee's involvement, the advisor engages in conversational practices (a), which address persuadee's personal and response involvement (b), which then contribute to persuadee's motivation to respond as expressed by the advisee's actual response (c).

P1 and P2 are accompanied by verbalized invitation to look at something, P5 often comes with direct speech quotations, P6 and P7 are being introduced by reference to the action being taken ("I will show you (later) a video"). P6 and P7 are of very special interest to the current study: they emphasize the role of modern IT in maintaining involvement. As presented above, the use of IT and the occurrence of multimedia-based practices is not coincidential – if an advisor tries to repair involvement of an advisee, he uses a whole sequence of practices and IT forms an important part of his arsenal. The practices overlap and intersect with each other – a choreography of gests, talk, and use of artefacts and multimedia emerges. However, P6 and P7 turn out to outperform the other practices with regard to effectiveness – comments to videos and pictures mostly include such statements like "oh!" or "ah!", or words like "frightening", while reactions to the others do not. Obviously, showing multimedia makes the advisees particularly involved, so that they feel incentivized to express their enhanced involvement. In this regard, the features of IT (video, picture taking) contribute to establishing effective ways of involvement management: while in the conventional case, the advisor repeatedly puts a lot of effort to re-involve the advisee, in the IT-supported setting simply positioning the device at the right place catches the attention of the homeowner. The video or picture in combination with the conversation make this effect even more sustainable – there was not a single case in which the video or collaboration with pictures would not cause a longer follow-up discussion.

Thanks to the advisors' statements during conversation, we can divide the practices as follows: P1, P2, P6 support personal issue relevance and result in enhanced personal involvement: advisors use the artefacts to explain why a feature is important. P3, P5, P7 address response involvement while stressing the impact of the decision that the advisee will take, e.g., impact on the appearance of windows or doors, family's life, and, finally, security. The character of P4 strongly depends on the content of the question.

To recapitulate, we identify the following differences between the IT-supported and conventional setting: First, the involvement practices with use of multimedia cause emotionally loaded reaction, as opposite to conventional case where standard confirmatory devices are used ("mhm" or repetitions at transition relevance places).

Second, the involvement practices with SmartProtector lead to more immediate and earlier non-verbal reaction to the stimulus than in the conventional case, where gesticulation starts later. Third, the involvement practices with IT cause readiness to talk (as visible through overlapping sequences) and lively discussions. Fourth, the IT-based involvement practices demand less interactional resources from the advisor to reach the same goal as in conventional case.

5 Discussion

5.1 Involvement in Persuasion and Conversation

Results enumerate and illustrate a set of practices, in which advisors engage when they maintain the advisees' involvement. Importantly, most of the practices involve use of external objects or the SmartProtector – only P4 and P5 have purely rhetorical or argumentative character. While the psychological take at persuasion conceptualizes the involvement in abstract terms, the current study shows the material nature of involvement practices. This is in line with the general intuition: for instance, whenever a teacher wants the class to listen carefully, he may point to the blackboard. P4 and P5, while not being essentially material practices, also introduce a dose of "tangibility" – the stories presented by the advisors and questions they ask involve hypothetical, but very down-to-earth scenarios. When following the psychological notion of involvement as an antecedent for persuasion, one would define the maintenance of involvement in a persuasive service encounter as actions oriented at stressing the relevance of an issue's true merits to the advisee (Chaiken 1980, 1987; Petty and Cacioppo 1986a). This study makes clear how much the availability of objects and tangible illustrations influences those actions. Consequently, we see the involvement maintenance and persuasion as material practices, thus extending the previous notion of personal and response involvement (Chaiken 1987; Johnson and Eagly 1989). The persuasion models from social psychology address the information processing and, thereby, provide grounded explanation of the processes behind persuasion effects (Chaiken 1980; Petty and Cacioppo 1986b, a). However, we postulate that they do not capture the highly practical nature of persuasion. This study forms an early step in this direction while presenting specific material practices.

In parallel, this study makes clear, how the sense of presence, of "here and now" as a situational and individual feature in conversation (Coker and Burgoon 1987; Burgoon et al. 1999, 2002) depends on the material. Objects which enter the conversation, be it a real window or a simulation showing how easy it can be broken, form an additional link to the situated action – using visual and acoustic channels, the sense of presence in this situation becomes more vivid. This study makes clear how the advisee's involvement, as expressed through a set of non-verbal behaviours, depends on the use of material by the advisor. Specifically, it points to the potential of modern media in this regard. When designing for potentially long service encounters, the designer should consider inclusion of vivid multimedia to give the advisor a tool to enhance the advisee's involvement with the click of a button. Furthermore, even positioning the tablet – or any other tool – in a specific way can make the advisee more involved: this element shall be transferred to the advisors during training as a specific technique. Beyond that, clarifying the advisors about the roles of stories and storytelling may be central, especially, when they often experience disinterest from the advisees. Overall, providing specific materials and

teaching specific techniques to the advisors may enhance the quality of the encounter and lead to elaboration of the discussed issues.

We claim, that supporting the advisors by providing effective material to involvement maintenance may contribute to the overall experience of a persuasive service encounter. In particular, offering material that illustrates how important, urgent, or unsafe an issue is to the advisee and what is the impact of her reply, e.g., by simulating the future (appearance, usage routines), can lead to better motivation to tackle the issues and consequently reduce the risk of advice discounting (Bonaccio and Dalal 2006; Klein and Stefanek 2007; Swindell et al. 2010). This offers new possibilities to the IS design research: IS can propose similar involvement maintenance techniques in other service encounters and are those applicable also to self-advice or robo-advice recently finding lots of interest from the community.

5.2 Involvement and Technology

Based on the above discussion, this paper proposes to bridge the notion of involvement from the social psychology (Petty and Cacioppo 1986a; Johnson and Eagly 1989) and the one propagated in conversation and communication studies (Coker and Burgoon 1987; Burgoon et al. 2002). Specifically, we propose to see involvement as the extent to which a person, in our case – the advisee, considers an issue or her response thereto personally relevant as expressed by her behaviour. Consequently, involvement maintenance is work which another person, in here – the advisor, does to make the conversation partner more involved, i.e., to make her express signs confirming that she considers issues or her response thereto personally relevant. So far, involvement maintenance was nothing more than an implicit and inherent element of the setting characteristic for persuasive service encounters, i.e., face-to-face conversation. Framing involvement maintenance as part of the service provision opens possibilities for effective support through modern technology and, especially, through multimedia.

This study shows how simple use of multimedia supports involvement maintenance. The episodes illustrate the effectiveness of a video or a schema, as well as the positive role of collaboration on a common virtual artefact, such as a sketch or a picture. Those tools get intuitively applied by the advisor when needed, as confirmed by the observation in the field. We propose to take advantage from the basic technologies, such as presentation of graphics, and to provide them to advisors in non-commercial persuasive service encounters. However, the occurrence of P3 and P5 point to yet another potential of modern IT: advanced simulation capabilities. We envision a tool that uses augmented reality to simulate how a window or door can be enhanced with security elements attached to it or to visualize how additional lighting may elucidate a dark exterior, thus adding expressivity to advisor's gesticulation (P3). Also, the story telling efforts (P5) would benefit from additional support, such that the stories advisors tell can be turned into lists of routines and guidance how to behave securely when being at or leaving home. Efforts in the proposed direction can benefit from combining approaches known from PT (Fogg 2009; Stibe 2015; Dolata et al. 2016) as well as IS, HCI or CSCW (Kaptein 2011; Yu et al. 2011; Baumer et al. 2012; Lehto et al. 2012; Fritz et al. 2014; Giesbrecht et al. 2015; Comes and Schwabe 2016a). While PT research focuses on a single user scenario provides design guidance therefore, it has not looked much into how the systems get used. Also, it has so far ignored the role of single-user or collaborative practices which make the persuadee follow the recommendation. This study does not only points to the concept of persuasive practices (Dolata et al. 2016), but also illustrates them with involvement

maintenance examples. Those practices and the ways of supporting them presented in this manuscript can get adopted to other fields both by practitioners (police people or doctors) and observed by researchers in the fields of CSCW, communication research, and, finally, IS service researchers. The practices perspective popular within IS (Nicolini 2012) and in HCI/CSCW (Kuutti and Bannon 2014), contributes to the understanding of persuasion as a real happening. Particularly, it emphasized that service research in IS shall incorporate the notion of persuasion into its agenda: commercial and non-commercial encounters embrace persuasive character. Understanding the persuasive practices and how to incorporate them into the service, be it on-line or face-to-face, may provide essential inspiration for the design of novel service models and redesign of existing ones. While the current study focuses on home security service encounters, its results may be applicable in other areas where problem-solving character of an encounter can be enhanced with additional persuasion (Dolata and Schwabe 2017a).

5.3 Limitations

The current study exhibits several weaknesses characteristics for qualitative studies of conversation, but tries to balance them out by considering results from a workplace study. The external validity of results is compromised by the focus on localized patterns (internal validity) and the interpretation of events. While we summarize the results from two separate data sets and account for their reliability, this study does not claim the standards of quantitative inquiry (no falsifiable hypothesis, no generalization beyond the described scope). Also, main data includes data collected in experimental context, which may de-naturalizes the conversations and the behaviour of the involved parties.

Part Three:

Digitally affording advisory practices

PAPER VII

Don't be afraid!
Persuasive Practices in the Wild

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Abstract
Advisory service encounters evolve from providing expertise to joint problem-solving. Additionally, advisees depend on persuasion, which drives them to follow the advisor's recommendations. However, advisors can be insufficiently equipped to persuade, resulting in advisees who are incapable of action or are unmotivated. Persuasive technology (PT) research proves that technology can motivate and enable people in single-user scenarios but pays limited attention to the natural realm of persuasion: the face-to-face conversation. This paper explores how persuasive technology transforms advice giving, a collaborative scenario involving an expert and a layperson. In such scenarios, IT does not act as a persuader but can provide affordances for persuasive practices, i.e., suggest new practices or enhance existing ones for convincing the advisee without deception or enforcement. We investigate the advisory practices in 24 real burglary prevention service encounters supported by IT. The paper shows the persuasive practices emerging through appropriation of the system, the tensions that govern the adoption or transformation of specific practices and routines and it confirms that studying the use and appropriation of technology uncovers organizational conflicts and tensions affecting such fundamental aspects as the advisor's role and job description.

1 Introduction

Advisory service encounters rapidly change their character: whereas in the past, an advisee primarily expected the provision of essential information, the available solution options and suggestions, he[5] now enters an advisory service equipped with diverse evidence and opinions from online sources (Bouwman et al. 2010; Escarrabill et al. 2011; Leune and Nizard 2012). An advisee who learns several contradictory opinions on the Internet may be confused and establish misleading preconceptions and expectations about the outcome of an advisory service. Those biases negatively influence utilization of the advice and, often, the quality of the decision (Yaniv 2004a, b). It can have a particularly detrimental effect if a patient disregards advice from a doctor and alters his treatment on his own or if a potential crime victim ignores police suggestions on how to keep safe (Swindell et al. 2010). Similar problems may also occur in other similar kinds of *beneficent advice-giving*, i.e., in advisory services oriented towards the advisee's wellbeing without monetary incentives on the advisor's side, if the advisor fails to address ineffective biases of the advisee, heuristics and preconceptions. Therefore, persuasion, i.e. interpersonal influence without deception or coercion, has the potential to enhance this specific class of counselling service. Additionally, the field of *persuasive technology* promises to leverage new mobile and multimedia technologies in order to enhance persuasiveness in various single-user scenarios (Fogg 2009; Oinas-Kukkonen 2010; Anderson and Agarwal 2010; Park et al. 2014). Knowledge concerning the application of persuasive technologies in collaborative scenarios remains rudimentary and concentrates on distributed collaboration (Yang and Kraut 2017). We know little about supporting persuasion with technology in a co-located scenario: in particular, we lack understanding on how persuasive technology impacts the highly sensitive social relationship in a co-located scenario and how the users will appropriate this technology given its potential impacts. This study develops a systematic understanding of practices that emerge through application of persuasive technology in real beneficent advisory encounters. It points to social, organizational and individual preconditions that form the advisors' persuasion routines in addition to the technology and situative context. It thereby expands on previous studies on persuasive practices conducted in the laboratory (Dolata et al. 2016; Dolata and Schwabe 2017b) and on the technological support of co-located collaboration in advisory service encounters (Novak and Schmidt 2009; Heinrich et al. 2014a).

The study presented was entangled in the last phase of a research project on supporting burglary prevention advisors in their daily work. In the *burglary prevention* (BP) scenario, police trained in technical security visit residents at their homes to advise them on how to secure their properties against burglary (Giesbrecht et al. 2015; Comes and Schwabe 2016a, b). The public mandate of police crime prevention units includes, among others, promoting the implementation of crime prevention measures and enabling communities to prevent burglary cases from happening. BP advisors act upon this task; however, they often lack systematic training for it. Depending on their career, they rely on an introductory hands-on training, general police officer schooling, exposure to burglary or crime cases in their previous appointments (e.g., during patrol or investigator duties), as well as experience from previous advisory encounters, and their technical expertise. Prone to influence by the complex nature of interpersonal communication, they differ significantly in how they motivate or enable their advisees and, as this study unveils,

[5] For simple gender balance and for clarity of the argument, we refer to the advisor (police officer) as a female (she, her) and to the advisee (citizen) as a male (he, his).

how they shape their task during this communication. Some focus on transferring the message: "*don't be afraid!*", whereas others exaggerate stories from criminal statistics. After the roll-out of the SmartProtector, a tablet-based tool designed according to persuasive technology guidelines to support a range of persuasive practices, the differences between the various advisors emerged. Each advisor favoured a stockpile of routines (stories, arguments, explanations, etc.) which were activated based on their preconceptions and observations about the advisee, the local or situational circumstances and the private perception of the advisor's task. This study makes clear that behaviours that were originally considered a mundane part of a conversation (e.g., a story from the neighbourhood), could be recognized as an essential and routinized persuasive device. The SmartProtector was appropriated as far as it could be meaningfully applied in the routines. This sheds new light on the persuasive aspect of the work: it grows out of a range of conversational routines and is not like a debate with explicit arguments or targeted behaviours. Consequently, supporting persuasion is less about extending the persuasive arsenal with technology but rather about equipping IT with a meaning that fits the stories, explanations, and narratives the advisors used to provide, and about affording new behaviours that may turn into routines. Overall, this study proposes the picture of persuasive practices as routines originating as strong stereotypes, as well as the advisor's opinion towards ongoing organizational discourses and tensions. Transforming those practices with IT requires consideration of multiple cues about the situation and its background rather than an optimistic assumption about the improvisational character of practices. The current study arrived at those insights by pursuing the following research questions:

- What are persuasive practices and how do they manifest themselves in advisory encounters?
- How do advisors appropriate persuasive technology in advisory encounters?

To answer these questions, we embed the study in a project conducted with four different police agencies in two countries, involving 9 local police departments and 18 BP advisors. The project was originally launched to specify the design of the SmartProtector in a user-centred process involving the advisors, advisees and police BP experts/managers. In the last phase of the project, the SmartProtector was rolled out for use by the advisors for at least six months. A researcher accompanied nine advisors to 24 BP advisory sessions and collected notes, as well as audio recordings, which form the data basis for the current analysis.

2 Related work

2.1 Studying Practices in CSCW

A practice perspective on work activities has been characteristic for the computer-supported cooperative work (CSCW) community for decades (Kuutti and Bannon 2014). While rooted in self-reflective and programmatic discussion in social sciences (Nicolini 2012), the practice lens on human activities has been adopted to elaborate on use and appropriation of IT artefacts in the CSCW (Schmidt and Bannon 2013; Kuutti and Bannon 2014) and information systems (IS) (Orlikowski 2008). Currently, the artefact-oriented research on work practice moves from laboratory settings towards "in-the-wild" studies using ethnomethodologically-informed methods. The usage of artefacts occurs in real social and material contexts between real stakeholders and outgrows the human, physical nature of interaction (Dourish 2001). However, as study of practices in the field is costly

in terms of time and labour, large areas of real work practice remain underexplored (Wulf et al. 2011). This study addresses the area of advisory service encounters, which leaves numerous urgent issues open: what advisory practices exist and what advisory practices emerge through introduction of digital artefacts.

Practice-oriented research in the CSCW pays special attention to the *transformative* nature of *practices* (Wulf et al. 2011). More specifically, CSCW has a long tradition of "designing for practices", those which already exist in the work context and those which may emerge through the introduction of an artefact (Schmidt 2011). Consequently, researchers observe and evaluate what practices emerge in the field, whether they reflect the practices intended in the design of the artefact, and whether the support is as effective as expected (Wulf et al. 2011; Kuutti and Bannon 2014) while following the situated-action perspective (Suchman 1987; Orlikowski 2008). The technology appropriation research discusses factors influencing the actual use of IT (Orlikowski and Iacono 2001; Dourish 2003, 2013; Orlikowski 2008; Stevens et al. 2010; Salovaara et al. 2011) and identifies patterns of use for artefact classes (Richter and Riemer 2009). The current study acknowledges the fact that practices resulting from appropriation of a technology have, to some extent, an improvisational character (Orlikowski 2008). However, it takes as its source the insight that routines and routinized behaviours strongly impact the conversations between people (Schegloff 1986). Since the advisory encounters have a strong social character and, at least for the advisor, are highly repetitive, the routines are likely to form an essential structure for driving appropriation of the IT. We therefore conceptualize practices as seeable, indigenous actions that participants directly engage in, but do not focus on in an analytic manner (Garfinkel 1967; Nicolini 2012). They are settled behaviours and interactional devices which have an internal, implicit order which gets re-enacted in interactions with other people and within the context of the action (Schegloff 1986; Wooffitt 2005). Given this description of practices, transformation of practices poses a serious challenge: routinized behaviours are persistent and depend on automatic processing of information rather than rational decisions (Kahneman 2011). Nevertheless, they often possess a more or less implicit rationale, a driver that lets them emerge in specific situations (Schegloff 1986; Scollon 2001). In particular, direct interactions with other people rely strongly on such routines driven by various rationales: from simply keeping the conversation going to more advanced rationales like receiving information or receiving acknowledgement (Schegloff 1986; Wooffitt 2005). Also, routinized behaviours typical for advisory services, i.e., advisory practices, have their specific rationales including rapport building (Heinrich et al. 2014a), impression management (Dolata and Schwabe 2017c), or contextualizing the recommendation (Fischer et al. 2017). However, specifying and describing this rationale is not straightforward, since the obvious masks the implicit: most advisors define their work as providing a recommendation (Schwabe and Nussbaumer 2009). It remains unclear what the typical practices characteristic for beneficent advisory practices are, what rationales drive the advisors' engagement in those practices and how transformation works in this context.

Dialectics offers a particular lens to observe and analyse routinized behaviours and approaches to transform them in a work context, including the technology-driven transformation of work practices. It was used particularly successfully in organizational change and innovation research to study how organizations develop when new systems are introduced (Fidock and Carroll 2010). Dialectics describes forces and tensions that rule a particular social phenomenon and therefore allows the systematic identification of what drives a group of social agents to establish contrary behaviours: it points to opposite

forces that may be hidden for the sake of conserving the social order and harmony in an organization (Ven and Poole 1995). Dialectics sees tensions as antithetical, antagonistic relations between contrary forces that an individual needs to balance out (Fidock and Carroll 2010). Whereas the lens seems appropriate for studying cases where technology appropriation leads to various, contradictory practices, only a few studies make use of it (Myers 1995; Cho and Mathiassen 2007; Carlo et al. 2012), and if they do, they focus on tensions between the organization and an individual. We propose the dialectic perspective for studying and explaining situations, where the observed subjects (in our case, the advisors) systematically and repeatedly engage in practices that essentially differ from each other, not only concerning individual performance (e.g., advisors formulating their question in different ways) but also the advisor's explanation for the rationale behind their performance when confronted with the difference. This follows Scollon's (2001) view, which accentuates that a practice expresses political, societal and organizational discourses, apart from being a situated performance. This adds to the routine-based practices' definition introduced above: the routines do not only follow the rationales and current, situative cues, but they incorporate social and organizational discourses. Since the design of any artefact cannot be agnostic towards the way it gets enacted in practice (i.e., it affords some practices, but not others) and towards organizationally or politically-motivated rationale, this approach seems appropriate for studying digital transformation of practices. Particularly, some practices will emerge in line with the technology design, while others emerge *in spite of* the affordances of the system, action offerings, and *spirit*. A *spirit* (DeSanctis and Poole 1994) or a set of intended practices (Wulf et al. 2011) can originate from multiple sources (project team's vision, product owner's vision, key user's vision, etc.), but only the confrontation with real world use allows its validation. The dialectic of giving beneficent advice elaborated later in this manuscript represents, therefore, a polemic between the contrary values of various user groups but incorporates the fact that some values and structures were more compatible with the practices envisioned and intended in the SmartProtector's design.

2.2 Supporting Advisory Services and Advisory Practices

Advisory services pose a specific form of collaboration which involve an advisor and an advisee. From the service-science perspective they form a high-touch point of contact between the service provider and the service customer with potential for intensifying the relationship (Jungermann 1999; Vargo and Akaka 2012). From the conversation studies perspective, they are a specific form of institutional talk, i.e., interaction where both interlocutors have their typical organizational identities and act upon them while employing language, materials and body accordingly (Drew and Heritage 1992a; Svennevig 2001; Svinhufvud and Vehviläinen 2013). From the collaboration support (including CSCW) perspective, they are a specific form of collaboration between two protagonists who may differ concerning their goals and knowledge states (Heinrich et al. 2014a; Heyman and Artman 2015; Fischer et al. 2017). For instance, advisory services are modeled as rational problem solving where solution follow from an analysis of the situation and available facts in a stepwise deduction and optimization process (Simon 1978; Comes and Schwabe 2016a). The various perspectives on advisory services stress their complex character and the extraordinary role of the subtle, interpersonal dimension, which is typical for collaboration that happens only occasionally between strangers (Drew and Heritage 1992a; Heinrich et al. 2014a). Similarly, they stress the fact that advisory encounters rely heavily on the stereotypes advisees and advisors have about what

happens and what should happen in those encounters (Jungermann 1999; Svinhufvud and Vehviläinen 2013). Consequently, advisory encounters have generated significant interest in the CSCW and IS communities, thus leading to valuable insights about the role of the material (Dolata and Schwabe 2017c), face gaze (Heinrich et al. 2014a), and data (Fischer et al. 2017) therein.

Currently, advisory services are undergoing an intensive phase of transformation. The changes are driven by technology entering the encounters, expectations of the customers, as well as by the easy, on-line access to information, which was previously available only to experts (Schwabe and Nussbaumer 2009; Dolata and Schwabe 2017a). Due to this transformation, the main focus of advisory services moves from information provision and recommendation to joint problem solving (Dolata and Schwabe 2017a). This is reflected in the emergence of new advisory practices (Dolata and Schwabe 2017b, c; Fischer et al. 2017). For instance, energy advisors involve the advisee during the analysis of specific, individual data for providing a suitable recommendation rather than generic suggestions (Fischer et al. 2017). Similarly, bank advisors try to learn and document many aspects of an advisee's life, while asking typical questions, to offer an individualized rather than a standard, off-the-shelf package (Kilic et al. 2017). The advisory practices encompass situative, improvisational elements (Fischer et al. 2014, 2017), as well as routinized behaviours and conversational strategies (Dolata and Schwabe 2017b, c; Kilic et al. 2017). For example, in a BP advisory service, an advisor may routinely suggest a specific rim door lock with a bolt and present its working mechanism with a specimen; however this behavior will emerge if the door explicitly requires such a lock or the advisor notices that the advisee uses a (potentially insecure) chain lock (Dolata et al. 2016). Given the fact that the advisory practices combine routinized and situative behaviour, and considering the ongoing transformation of advisory services, this field offers a range of relevant research questions: What is the main point of an advisory service if not the information transfer between an expert and a layperson? How can IT support new practices that outgrow previously existing routines? How should IT take account of the situative character or situative activation of some practices?

Previous research positions technology in advisory encounters as a shared artefact of focus (Novak 2009), an ad-hoc provider of specific information or context (Heyman and Artman 2015; Fischer et al. 2017), a tool to develop an advisor's skill on the job (Giesbrecht et al. 2016a), or a motivational device through enhancement of the hedonic qualities of interpersonal interaction (Novak and Schmidt 2009). The IT artefact deployed in the current study, SmartProtector, borrows from previously existing tools in several ways, while extending their potential to afford persuasion in interpersonal encounters (Comes and Schwabe 2016a, b). Thereby, the system answers the increasing need for supporting attitude or behaviour change in the advisee. In particular, we encounter essential shifts in what doctors need to do during their medical services: due to patients being 'prepared' by looking up their symptoms on-line, doctors are increasingly involved in persuasive efforts by reassuring or rejecting patient narratives, proposing their own opinions, or engaging the patient in self-diagnosis (Zucchermaglio et al. 2016). In such and similar contexts, including BP, the persuasion happens in between, irregularly, without explicit character and often without consideration of the advisee's biases or presuppositions (Yaniv and Kleinberger 2000; Yaniv 2004b; Swindell et al. 2010). In other words, the advisor does not normally try to identify what bias may impact the advisee, but routinely and intuitively employs means to convince him: whether the advisee fails, due to the anchoring effect (the first information found seems most plausible) or confimation bias

(selecting cues based on their concordance with pre-existing beliefs), does not play a large role (Swindell et al. 2010). This may lead to unsystematic and ineffective behaviours in the advisor, who may, e.g., approach a decision in a purely logical manner, while the advisee's decision is purely emotional. The authors adhere to the general assumption, that persuasion may enhance the qualitiy of advisory services in many areas. Not only the public agencies want to enhance effectiveness of service encounter, but also the advisees increasingly seek a clear recommendation support them at dealing with the confusion and information overload[6]. IT could enhance the persuasive character of advisory encounters (Comes and Schwabe 2016b); however, it remains open as to whether and how the advisors would employ it in practice: would they be receptive to the possibility of persuasion provided by a system? How would they use it?

2.3 Persuasive Technology and Persuasive Practices

Persuasion has been traditionally defined as "human communication designed to influence the autonomous judgments and actions of others" (Simons and Jones 2011), or, alternatively, as "a successful intentional effort at influencing another's mental state through communication in a circumstance in which the persuadee has some measure of freedom" (O'Keefe 2002). Normally, the persuader appeals to the persuadee's human drive, mental state and cognitive abilities (O'Keefe 2002; Cialdini 2007; Simons and Jones 2011) and the persuadee does or does not change her own behaviour and attitudes, i.e., produces a specific response to the persuasive effort (Cialdini 2007). Persuasive practices were previously framed as a persuader's routinized actions conducted to reinforce, change or shape a persuadee's attitudes or behaviours without deception or coercion (Dolata et al. 2016). While normally these practices emerge organically, through experience and on-the-job training (Swindell et al. 2010), recent experimental and conceptual research shows that they may also emerge through enactment of structures provided by an IT artefact (Dolata et al. 2016). Nevertheless, we still lack knowledge about the persuasive practices, as they emerge in the wild and how IT may form them or not; given the complex nature of practices encompassing routinized and situational elements, as well as political and organizational discourses. This manuscript explores persuasive practices and their manifestation in an ongoing collaborative effort: to what extent is IT-supported persuasion a routine? To what extent is it an improvisational achievement? How does it depend on the larger social and organizational context?

Persuasion as a type of human-to-human communication has been widely considered in psychology literature yielding a number of models to explain how people respond to persuasive effort (Chaiken 1980, 1987; Petty 2013). *Persuasive Technology* (PT) employs this knowledge to propose IT-based persuasion in the following single-user scenario settings: computer-human influence, computer-mediated human-human influence, and computer-moderated human-human influence (Stibe 2015). PT has not considered the persuader as an individual in the cooperative situation (Oinas-Kukkonen and Harjumaa 2009; Oinas-Kukkonen 2010; Stibe and Oinas-Kukkonen 2014; Stibe 2015). Instead, PT explores designs which produce a persuasive effect; thereby, it relies on the model for persuasive design proposed by Fogg (2009), who claims that IT shall (1) *enable* the persuadee to tackle the issue by explicating what effort is needed to reach the target state,

[6] Discussion of the political dimensions of open or implicit persuasion especially in light of the existence of such units as Social and Behavioral Sciences Team under the Obama administration (Kahneman 2011), goes beyond the scope of this article. We adhere to the standpoint, that persuasion efforts are legitimate as long as they follow persuadee's interest and exclude deceipt or coercion of any kind.

(2) *motivate* the persuadee through rejection of the current state and emotional discomfort related to it, and (3) *trigger* her to act, i.e., facilitate the change of behaviour and attitude at the right moment. This model was shown to be compatible with the psychological background and was later extended to a socio-technical model (Oinas-Kukkonen and Harjumaa 2009). Only recently, PT has acknowledged the potential for application in collaborative settings, where persuasive design can assist the persuader at enabling and motivating the persuadee in an advisory scenario or in a team collaboration (Dolata et al. 2016; Yang and Kraut 2017). However, the transfer or design guidelines from a single-user scenario to a collaborative scenario pose essential challenges: what is the role of the technology? Does it take over the role of persuader (while the person remains a collaborator or an advisor) or does it afford persuasion? What/who assesses the need to enhance the persuasive effort – the technology or the persuader? Who assesses what the appropriate target for the persuasion is?

PT has traditionally addressed domains where the persuadee has clear objectives and the PT supports a particular way of reaching the goal (losing weight through a combination of sport and healthy food or giving up smoking by reducing the number of cigarettes per day). An advisory context and, in particular, BP poses a challenge, because the ultimate target (e.g., being secured against burglary) is more abstract than the above and does not generate a coherent, concrete picture of the future, but is rather a wish. Ways to reach the state are also unclear for two reasons: (1) while almost everyone knows (or claims to know) what to do to lose weight, it is not common knowledge how to prevent burglary, (2) while losing weight or giving up cigarettes primarily involves behaviour changes (which are at the heart of PT according to Fogg (2009)), preventing burglary often requires changes of attitude such as maintenance of fear (Gabriel and Greve 2003; Barberet and Fisher 2009). Criminology literature suggests that, in crime prevention, *enabling* relates to the education of individuals and communities about the crime and about adequate safety precautions to enhance the self-efficacy of the potential victims (Ozer and Bandura 1990; Davis and Smith 1994; Madero-Hernandez et al. 2016), whereas *motivating* embraces moderating the *fear of crime* to a level which is unpleasant to the potential victims (and activates them), but without making them too afraid to manage or enjoy their life (Erete 2013; Bernasco 2014; Madero-Hernandez et al. 2016). Overall, research relating to persuasion and technology provides valuable insights on the nature of persuasion and indicates that it can be engineered. However, its focus so far has been on single-user scenarios, so that we know only little about how following PT guidelines can change persuasive practices in advisory services.

3 Artefact Description

The SmartProtector was designed in a user-centred process. The advisors' requirements were collected through observation of two key users in their daily work in 2012, followed by workshops in 2013, and later during the design of working prototypes. They were tested in simulation experiments with various BP advisors from Switzerland and Germany in the years 2013, 2014, 2015, and 2016 (Giesbrecht et al. 2015; Comes and Schwabe 2016a, b). The police management requirements and suggestions were collected in interviews and workshops throughout the project. They primarily wanted to improve the adherence to advice among advisees to reduce the number of successful burglaries. Advisors stressed the importance of rapport building and the need for reducing the overheads of formalities relating to setting up and documentation of an advisory service

on-site and later in their office. The SmartProtector was designed to support the overall performance of a BP advisory service and, in addition, afford the persuasive practices proposed by the stakeholders and supported by the literature. In the following, we summarize the affordances and their expected effect on the advisor's practices.

Supporting a Rational Process: the SmartProtector implements (but does not enforce) an advisory approach, which felt most natural to the key users. Through the graphical representation of the tool's main menu (Figure 16), advisors are encouraged to engage in a process which begins with information about the house (*protection object*), followed by the identification and discussion of the advisee's most urgent and important *protection needs*. Then, the advisor and the advisee *explore* the property to identify security flaws and elaborate on them. Finally, they develop a *security plan* combining all the proposed solutions into a coherent action plan. This represents the routines of all key users from the design phase.

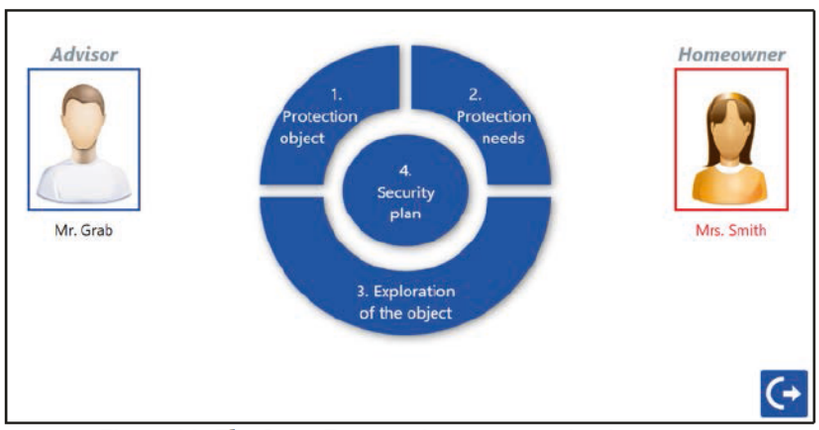


Figure 16 The SmartProtector's process navigation screen.

Identifying Protection Needs: to afford an actual discussion of advisee needs, the SmartProtector provides a list of the most frequent advisee needs (Figure 17 - left). The explicit mentioning of the advisee's needs should help him and the advisor address and maintain his fears and offer space for emotional messages.

Separating and Linking Problem and Solution: during *exploration of the object*, the advisor and the advisee discuss various security flaws. By separating problem and solution areas for each security flaw, the SmartProtector affords (1) specification of the current situation and why it poses a security problem (Figure 17 - right) as well as (2) the choice of an adequate technical, electronic, behavioural solution and explanation of why it fits the given situation. Since the problem and the solution are linked to the same item, they also remain linked to each other. This empowers the advisee to single out the diagnosis concerning an item (e.g., *a window or a locking mechanism*) and the rationale behind the proposed solution (e.g., *a grid as opposed to an alarm because of the required cellar ventilation*).

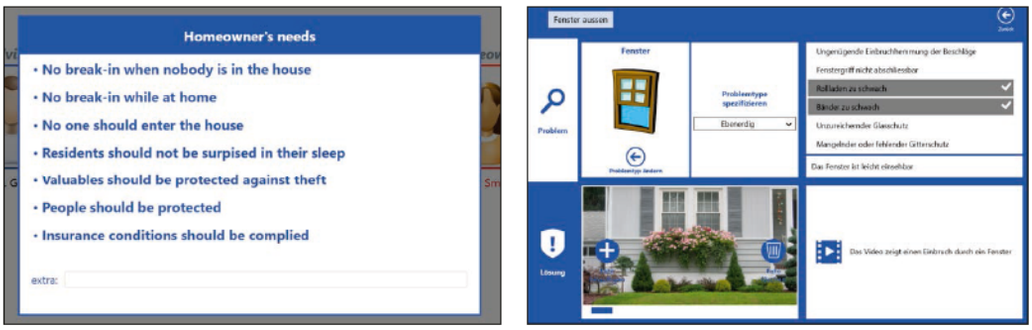


Figure 17 *Left*: The protection needs screen; *Right*: The problem specification screen.

Specifying Problem and Solution: to describe a security flaw as a problem, the advisor can define what element is problematic (e.g., *window* in the *cellar*); he can characterize how it is a security issue (e.g., *easy to reach* and *weak hinges*); he can take a photograph of the object and use markings to illustrate the critical points (Figure 17 - left); and he can use a video to make clear to the advisee how a similar window could be used by a burglar to break in. Similarly, the tool provides ways to characterize the solution: the advisor can choose from and discuss all relevant technical (e.g., grids, hinges, locks), electronic (e.g., alarms, surveillance cameras), and behavioural (e.g., habits, tricks) solutions from her organizational database; she can illustrate them with pictures, schemata or videos; finally, she can choose the appropriate ones to flow into a *security plan*. The design concerning the problem and solution dimensions is in line with the general rational problem-solving approach, but it also provides access to vivid multimedia material to afford emotionally loaded messages when describing the issues and proposing solutions.

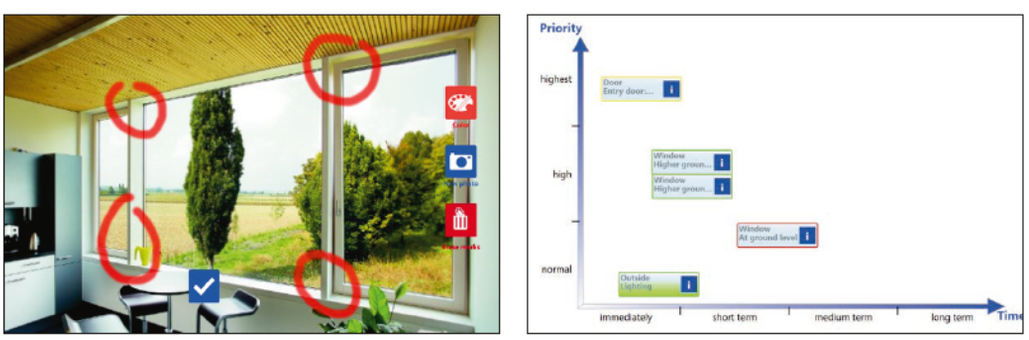


Figure 18 *Left*: The picture taking and sketching screen; *Right*: The prioritizing issues screen.

Composing an Action Plan: the *security plan* summarizes the security flaws identified earlier, suited to the collected needs of the advisee. The plan will also provide means for the advisor and the advisee for a collaborative combination of the proposed solutions into a coherent plan for action. Traditionally, advisors summarized their recommendations verbally, by writing down a random list of suggestions, or by marking suggested solutions in brochures. The SmartProtector answers the requests from the practitioners by affording classification and prioritization of the proposed solutions (Figure 18 - right).

Overall, the design of SmartProtector offers several practices, which have a motivating or an enabling character. They should enhance the persuasive character of the encounter, as demanded by police managers and advisors, and as claimed by the literature. The experiments conducted throughout the project show that the advisors (following training or guidance in experimental settings) respond positively to the affordances and see the potential improvements resulting from new or transformed practices. Also, the analysis

of test advisee feedback suggests that the practices have the expected motivating or enabling effect (Giesbrecht et al. 2015; Comes and Schwabe 2016a, b). However, the impact of the SmartProtector on real advisory services remained unclear.

4 Methodology

The study aims to observe real work practices which emerged during appropriation of SmartProtector. Therefore, this study essentially differs from past experiment-based studies (e.g., Dolata et al., 2016). The observation was embedded in a development and roll-out project with four police agencies (two from Germany, two from Switzerland). The project started in 2012, but the data collection happened only in the last phase. The roll-out of SmartProtector for daily use by the advisors was carefully prepared: the advisors received training on the SmartProtector's usage and the use scenarios implied in the design. They also had the opportunity to try it out in experimental sessions and simulations with test advisees.

This manuscript uses data collected during a longitudinal field study in June and August 2016. An observer accompanied nine randomly selected advisors during their visits to clients' houses, on their way between the appointments, and during preparation and post processing. The advisors selected had all used SmartProtector in at least 10 service encounters before participating in this study. Overall, the observer visited 24 advisory sessions conducted by advisors using the system. For security reasons, only little demographic data about advisees was collected, but from the type of property and from what was recounted in the advisory service, the observer can deduce that they mostly belonged to the middle class. Around a half of all services were conducted in flats, the other half in single-family houses. The professions of the advisees included a farmer, a teacher, office clerks and retired persons. All properties, except for one, were used by at least two persons (mostly a couple with or without children). Since the advisory sessions focus on security-relevant issues and affect private and intimate topics, extensive audio or video recording forms a security risk and was not possible. The primary mode of data collection was chronological note-taking: the notes describe the interaction between the participants, primary conversation topics and general argumentation structure, as well as interaction with tools and objects. Material produced during the advisory sessions (anonymized documentation) was used to complement the notes. Voice recording was used to capture formal and informal conversations between the observer and each of the advisors, where they reviewed specific events from the sessions. As SmartProtector had been successfully used over 1250 times during the pilot run (without technical support from the developer or the researcher), we claim that it had reached the popularity and maturity of a productive system and permitted observation of "settled" practices. Additionally, the study uses information collected in the form of audio-recordings from three workshops conducted in June and September 2016 for triangulation purposes. Parts of the workshops were conducted only with the advisors; other parts included their managers too. Eight managers participated in the workshops; they were invited to participate for two reasons: they initiated the roll-out of SmartProtector and were curious about the advisors' opinions, and they represented the organizations' opinion in the discussions. Each workshop participant (advisors as well as their managers) had an interview of approximately 45 minutes.

The research team addressed data coherence: (1) all observations were made by a single researcher who did not directly participate in the development of the

SmartProtector (2) the observer collected data in a short and recent time period (3) all advisors used the same version of the system with the same functionality (4) all advisors met the observer not less than three but not more than five times before the observation (5) all advisors and advisees agreed freely to the observation (6) each advisor participated in at least two observations.

The observations of 24 advisory sessions, recordings of informal and formal discussions with the advisors after those sessions, and the whole-day workshops described above provide the following data set: 185 pages of observer's notes in B5 format, approximately 70 hours of audio recordings from discussions and workshops, and 264 sheets of paper, including drawings or written comments from the workshops. The collected data was digitalized. For the analysis, we followed a two-tier process: first, the observer, under the supervision of two other experienced researchers, structured, iteratively coded and grouped the heterogeneous data according to their chronological order and thereby prepared the practices listed in the results. The coding applied in this phase was reflected the advisors process steps (hence the structure of the respective section in *Results*), the usage of the tool's features and the intention of the practice as declared by the advisor in the interview. Second, the researchers analysed opinions collected during workshops and in conversations used to explain the *advisors' view*.

5 Results

Generally, advisors follow a three-tier process starting with a preliminary examination of the building, including the immediate neighbourhood, an introductory discussion with the advisee, and then they explore the property, including the garden or staircase, if necessary; finally, they summarize the service encounter. The core elements of the process are surrounded by small talk initiated by either of the parties. The discussion has a mainly natural character but security remains the focus, even during small talk.

5.1 Protection Object and Protection Needs

Advisors give the advisee the opportunity to introduce their needs by asking questions like those in Table 10 *(a, b, c)*. Some questions are more open and invite a wider-ranging contribution (*a* or *c*), while others have a closed character to identify two kinds of advisee (*b*). Similarly, discussion of the advisee's response can have a more open and explorative character (*d*), be a review of cases or burglars' tactics, which confirms justified or contravenes unjustified advisee fears (*e* or *f*), or simply close the discussion (*g*). Sometimes, an answer to the closed question *b* was followed by no essential reaction (*g*) and the advisor moved on to exploration of the property. The SmartProtector was intended for use as a common artefact for discussing a set of "standard fears" and focusing the advisee on the ones which are legitimate, given the recent advisory cases and burglars' tactics, and invalidating those which are irrational and reduce the advisee's feeling of wellbeing. However, it was used that way in only the minority of cases. In other cases, the advisor noted the needs while holding the tablet as a private artefact of work (without sharing the screen with the advisee) or simply omitted this point altogether. Excerpt 1 one illustrates an advisor asking an open question while using the SmartProtector as an excuse; she positions the tool as a common artefact and discusses the advisee's statement while referring to burglar tactics.

A. Collecting Protection Needs
a. Asking: *What is the reason for our meeting?* or *What do you expect from today's meeting?*
b. Asking: *Have you ever been a victim of a burglary case?*
c. Asking: *What are your specific needs on security?*

B. Identifying Protection Needs
d. Discussing potential fears and their impact on the advice
e. Assessing the needs in light of burglars' tactics
f. Assessing the needs in light of recent burglary cases
g. Accepting the answer from the advisee without discussion

Exemplary Interaction (Excerpt 1)
P: We've got a new technology now in our department, it helps me to collect information now; and it lets me ask you for your needs and fears – so, what do you think?
P positions the SmartProtector between P and C
C: Oh, okay… Well, I am simply afraid that somebody will come into the house; you know when I am sleeping or when I am away.
P ticks the boxes for those needs in the tool's choice list.
P: When sleeping… h… and when away… ok. Noted. But I need to let you know, that – even though being a horror scenario – burglars do not enter houses when somebody is in there, even when sleeping. They do not want to meet anybody when working *(continues talking about the job of a burglar in relation to fears)*

Table 10 Practices applied when discussing protection needs (P - police officer, C - citizen).

View of advisors and management: advisors provide three explanations for diverging from the identification of protection needs: (1) They feel uneasy asking the advisee about their fears. The advisors claim that the advisees are not aware of any fears at the beginning of the advisory session or, on the contrary, all advisees have the same fears. (2) the advisors primarily want to teach the advisee something new, so they present what they know best (i.e., burglary strategies). (3) the advisors see themselves as technical and not behavioural BP experts. An advisor assumes the behaviour of advisees to be primarily rational and knowledge oriented: "*People only approach us if the fundamental will to be convinced is already there. People already want to change something, but they just do not really know what they need to change*". Nevertheless, some advisors systematically engage in discussing the advisee's needs and fears and they build upon that to explain the differences between burglary and robbery, clarify the likelihood of those crimes and explain the criminals' motives, and, if necessary, moderate the fear of crime if the advisee misinterprets news or societal changes. They also make clear how the advice will address their credible fears. An advisor says: "*No matter if they implement something afterwards or not, for me the advice has already been successful when I realize that the fears can be taken or channelled, that one can deal better with the fears*". Another advisor presented a screwdriver (i.e., a tool, burglars use in the vast majority of cases) each time he was discussing the fears in relation to burglar tactics. He explains: "*I use it in almost all my advisory sessions to show how little is required to break in, but also to make clear that a burglar is not prepared to kill or harm people or is in anyway equipped to do so (…) I also draw the house with the percentage [of listed burglary incidents per floor] to capture and direct their fears. This is what I do by default, regularly, so I keep my knowledge of statistics updated.*" Those BP managers interviewed see it as part of a police officer's job to enter into dialogue with the public and listen to people's expectations. Considering the persuasive character of the encounter, some managers would go as far as defining the success of an encounter by assessing how it manages advisee security needs and fears and whether it can employ them for activating the advisee: "*So we want to sensitize and motivate and give responsibility to the citizen, such that he can do something about the fears and not remain passive while saying 'I hope this does not happen to me'. But that he becomes aware of the fact that he can actively do something about it (…). We see ourselves as a service provider to the citizen.*" Overall, some advisors see it as an essential part of their work to motivate the advisee by harnessing their needs for change and fear of crime for motivation (*a, c, d*), while others stress the role of the objective, and generally applicable information (*b, e, f*) and discount the individual character of the advisees' security needs. An advisor explains what he says when entering an advisory

service: "*Do not be angry with me, I'm a police officer, I'm totally impartial. I do not speak for or against a state government. I'll give you information here and I'll leave it to you, how you rate it*".

5.2 Exploration of the Object

Whenever the advisor encounters a security issue that potentially may be used by a burglar to break in, she points out the security flaw to the advisee (Table 11). While some advisors systematically explain why and how a security flaw is a problem (either because it can be leveraged by a burglar – *j*, or because it does not fit the advisee's needs and habits – *k*), others limit themselves to a general assessment of the item under consideration (*i*) or declare it to be a problem because a specific solution they already have in mind (e.g., a grid) is missing (*h*). The same can be observed in the sketches advisors create during the exploration phase. Some advisors mark problematic areas or weak elements, while others generate sketches of the solution to be installed (even though the SmartProtector provides schematic solution pictures). The SmartProtector was designed to afford a general definition of the problem, accompanied by its illustration, and an explanation of why it is a problem given that burglary is a negative event (*j*) – the latter can be supported with the videos provided.

After identifying an issue, the advisor proposes an adequate solution. If they have specified the problem they can build upon it, while explaining how the solution they propose improves the situation. However, some advisors systematically engage in very exact explanations of the mechanics of the solution. Moreover, some even employ a specimen (which can weigh up to one kilogram, e.g., *a window locking mechanism*) or an exact sketch they drew (*l* or *n*), accompanied by an outline from the SmartProtector (*m*), and interaction with the considered item through gesticulation (*o*). However, other advisors limit themselves to roughly defining the solution (*o*) and may present a picture (*m*). The SmartProtector affords an exploration of the possible solutions followed by the choice of the most appropriate one(s). If the advisor spends a lot of time and resources explaining a single solution, discussing others may not be an option. Furthermore, some advisees may be overwhelmed by the technical details.

C. Presenting a security flaw as a problem
h. Indicating that a security improvement is missing
i. Providing assessment of a feature as "insufficient"
j. Illustrating how a burglar might leverage the current weak point for breaking in
k. Clarifying why present security solutions are incompatible with the advisee's needs and habits

D. Proposing solutions for the security flaw
l. Presenting a specimen of the proposed solution
m. Presenting a picture of the proposed solution
n. Creating a sketch of the proposed solution
o. Illustrating the proposed solution through gesture and speech only

Exemplary Interaction (Excerpt 2)

P: How old is this house? Are the windows new?

P looks at the window frame and touches elements of the locking mechanism with the fingers (top, bottom, side).

Exemplary Interaction (Excerpt 3)

P: Ok. Here we've got your beautiful, green garden…

C: It's nice, isn't it? We spend a lot of time in here.

P looks around and signals that he enjoys the view.

P: I see… But there's always a risk with lots of bushes and trees. You see, the burglar can hide easily in the garden and nobody sees him, not even the nearest neighbour. Look, I will put it in here…

P takes the SmartProtector to the front, takes picture of the bushes, adds it to the problem description and puts the tool between P and C.

P: You see, you've got no sight in here. I know you need some privacy, so why don't you just cut parts of the bushes like this and the round like that…

P draws lines through the bush to show where to cut them.

P: And then it's really important that you keep well with your neighbour. Look, this works.

P draws a smiley to represent the neighbour (see below).

C: And this helps? I mean… they're just neighbours.

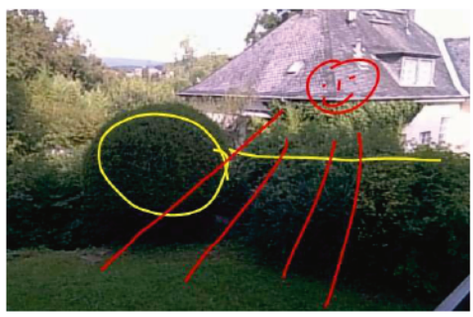
C: Hmmm… They're maybe 10 years old. I don't remember. P: You've got a weak locking mechanism, I must say. It uses just a single mushroom bolt to secure the downside of the window, while the others are simple rods. It has been a standard for years. Try to feel it with your hand down here. *P takes C's hand and places it first on the mushroom bolt, then on the rods at the side of the window. C nods, mumbles. P scrolls on the tablet and positions it between C and P.* P: A burglar can open a window like this within seconds because the rods just slip over the catch in the frame. Have a look at this picture. You see the difference, right? *P points to a schema in SmartProtector showing the bolt and the rod and turns her finger as if she was blocking the one and the other, and pretends to apply force to the imaginary bolt represented just by the picture on the tablet* P: And here I've got a video to show to you – it's almost exactly your window; you see, the burglar uses a simple screwdriver and he's inside there just within few seconds. *P and C watch a video on SmartProtector, C nods.*	P: We are able to clear most cases of burglary thanks to neighbours, who saw a stranger… *(continues on the role of good neighbourhood and community)* 

Table 11 Practices applied for discussion of the security flaws (P – police officer, C – citizen)

View of advisors and management: when asked for an assessment of those practices, the advisors differ in two specific points. First, some see their primary task in assessing the current state; they engage intensively in practices which clarify the reason for an issue being a problem (*j, k*; cf. Excerpt 2). Others, however, argue that the advisees already know or can imagine their BP security flaws and the role of the advisor is to suggest an appropriate, skilled worker-compatible solution; they focus on the solutions when approaching single security features (*h, i, l*). Second, some advisors see media as the primary means they can use to enhance their argument for the necessity to approach a specific issue (*m, n*) they desired more videos and pictures showing the effects of a successful burglary. An advisor even uses them to manage the impression citizens have of policeman and burglars: "*Through the tablet's functionalities, I can just better explain the things to the people such that they can understand it better. And I do not have to talk that much because I can show it better with pictures or videos, for example. This is much more memorable for the people. They see their thriller on the tele and think, what they see is real. If I tell them: The police life is more boring than the thriller, they don't believe me. And this comparison holds for the tablet too. If they then see the films and characters on the tablet, or if I mark the flaws on the picture of their own window, their own door, it is more memorable for the people and they believe me more.*" Others, however, do not want to spread fear and choose to use multimedia primarily for explaining the solutions and proper habits, especially if people have recently been victims of a crime. However, there are also advisors who continuously try to put the problem and solution in relation to each other: with each solution they propose, they provide an explanation as to how it prevents the burglar from breaking in (cf. Excerpt 3). An advisor emphasizes the opportunity for combining her practices with SmartProtector's functionality: "*I was then able to support my argument with the inserted videos, but then combined that with my conventional advice (...) For example, with the secure and unsecured window, I could then use one specimen that I've always used to present, and support this with multimedia again. Therefore, the combination was ideal.*" Another advisor makes clear, she leverages the SmartProtector to support her narrative concerning burglar techniques: "*Finally, it complements the story, as I've done it all those years (…) When I tell the story in my advisory services and say: 'We can do something concrete such that the perpetrator doesn't get into the object so quickly', I can add: 'Let's take a look at the movie. Then you can see what such a bad lad would need to do if they wanted to get into a secured object'.*" While this advisor used the video to show that there are solutions, she would rather continue with her story than

elaborate on the particular solution and, instead, she moved the topic to the end of her advisory session. The same advisor adds however, that how each advisor accommodates the SmartProtector may depend on that advisor's routines: "*We've got a lot, many lone fighters among us. You shouldn't forget that either. They had to fight through the matter alone and compile, develop something that works for them.*" While the management was aware of systematic differences between advisors and about the fact that each advisor has her own default and usual routines, they were surprised by the content of the routines. For instance, it was new to the management that some advisors tend to explore the problem and only roughly discuss the solutions. However, they knew of the advisors who regularly specify a solution like a skilled worker would do (they called them "techies"). Still, the management did not see much advantage in probing into the mechanical details of the solutions and considered it "missing the point of advice". The management would see SmartProtector equipped with additional easy outlines and videos as part of the strategy to balance out those tendencies and to put more emphasis on *convincing explanations* rather than *recommendations*: "*Some have problems to talk about the problem, I know. Look, it's so because they are often just like any policeman and think: 'These are the recommendations that we make, they're right and ours. I need to present the solutions and recommendations, like in a checklist'. And that's where SmartProtector can be good, because sometimes the advisee is not sure where he is and where he wants to be regarding their security (…). He needs to understand and come along, right? Sometimes you think he has understood, but he has not understood it and he does not dare asking you back*".

5.3 Security Plan

Having identified the relevant security flaws and solution, advisors engage in summarizing the encounter. In pre-SmartProtector advisory encounters, the summaries were mostly a listing of all issues considered, which only occasionally hinted at the most urgent point, or even where to start. Since the SmartProtector clearly affords prioritization, after the roll-out the advisors established various ways for dealing with the prioritization/listing (Table 12). Two general tendencies can be observed: (1) the advisors engage in visible interaction with the SmartProtector, so that the advisee can see and understand the rationale behind the suggested order (*p, q, r*) or (2) the advisor uses SmartProtector as a private artefact, whilst giving the same urgency and priority level to all issues (*s*). While the design rationale of the SmartProtector was to afford prioritization when considering advisee needs as well as the statistical risk (may be higher in the cellar than in the first floor), the emerging practices differ: some advisors present only their own assessment (*p*) or they use prioritizing to highlight easy to achieve options to the advisee (*r*). Overall, the practices used involve a kind of prioritizing but often disregard the advisee's position (*p, r*) or ignore him altogether (*s*).

E. Setting priority of identified issues
p. Sorting the issues according to the advisor's assessment of the burglary risk exposure; with an explanation to the advisee
q. Sorting the issues according to the advisee's needs and fears; in a collaborative process, together with the advisee
r. Dividing the solutions into low-cost-and-effort ones and the rest; in a collaborative process, together with the advisee or with an explanation to the advisee

Exemplary Interaction (Excerpt 4)
P: So, I think, we've seen everything, haven't we? Cellar, ground floor including guest toilet, first floor, garden…
P lists the areas while distributing the issue cards across the screen, C and P stand next to the table, about to sit down.
C: It seems to me... No more questions from my side so far.
P: It's definitely urgent to repair the cellar door, right? But you already agreed with me that they really are an issue. I will put them to 'immediate' and 'high' here, on the graph…
C: Yeah, and the window just next to it. The grids, you know.

s. No prioritizing or setting all issues to "high priority" and "immediate"; in an individual manner, without including the advisee in the action	P: You're right… *(searches through the issues moving them on screen to different sides)* There it is. OK. Then we've got the balcony door. Improving them will cost money and time, so maybe "middle-term" but they have a high priority in my opinion – you've seen yourself, just few seconds to open them if you know how… *(continues with other points)*

Table 12 Practices applied to summarize the encounter.

View of advisors and management: when confronted with the differences concerning their prioritizing practices, advisors argue for their own personal practice when referring to their understanding of how persuasion works and what role a police officer plays in this regard. Advisors who consider advisee needs and fears or abilities during prioritization (*q*, partially *r*), want the advisee to start with a solution that is most convenient to him, the advisee, and hope that he will adopt other points thereafter: "*You mostly feel that they want to do something, but they do not know yet what and how - sometimes it's even difficult for me to assess, where to set the priorities. Each advisee and each house is different. (…) Do I set the priority as a consultant with police knowledge or where I would see the priority for me and my spouse? I define the prioritizing in the counselling as trying to win people over as far as I can: where do they currently have the opportunity (not just financially) of implementing something? Is it to trim the hedge? Is it to install a girder and thereby strengthen the sense of security for the first moment?*" Advisors who rely on their own assessment (often supported by statistics) or see themselves as unable to provide any reasonable priority list (*p, s*), are afraid of advisees feeling secure just because they have implemented the most urgent improvements: complete safety comes through implementation of the full "security package". Interestingly, those advisors who do not engage in prioritizing claim that the advisees are motivated enough if they pay attention to the BP service encounter, so that any further assistance in this regard is unnecessary. As an advisor puts it: "*People know what they want from me. They want to have independent information from me: 'How can I secure a house as effectively as possible?' (…) I put every issue on 'immediate', and I push everything on 'as high as possible'. I also tell people very clearly: 'You know, I could tell you now that this window is more endangered than another window. But, the one perpetrator comes just over the cellar, the other offender is better over the balcony. (…) And yet another does not even try it on the ground floor, because he always works at the basement.' For me, the priorities are always at a single, constant level. That's why I postpone practically everything to 'immediate'. You cannot implement a part and think, you are more secure.*" Advisors, who engage in collaborative prioritizing review the issues and the proposed solutions together with the advisee, try to learn how many resources are available on the advisee's side, and try to incorporate them into their own assessment. The management members had mixed opinions about what is more important for prioritization: the advisee's situation or the advisor's assessment. Those who opted for the advisee's situation as being more important see the prioritization list primarily as a trigger for taking the next step; those who favour objective assessment (based on statistics), or the advisor's opinion, see the prioritization list as a decision support tool. Interestingly, when confronted with the statement that a very rational decision taken upon the result of an advisory session may be to not implement any security improvements, only one management member and no advisor accepted it as a reasonable response; all other interview partners would consider such an encounter a failure. One manager put it this way: "*Our purpose is – I've said that before, so I'll say it again – actually to see that more households in our state are secured, that the rates of unsuccessful to successful burglaries are increasing. (…) For the most part, we cannot just have nice conversations with the advisees, to bring them to make risk assessment – 'Do I do something about burglary risk? Do I leave it the way it is?' That would be a total loss. A representative who works this way would*

be fired from his company very early if he did not bring any contracts". Many advisors share the reasoning: "*Well, if someone, after the advisory session, arrives at the decision not to do anything, because 'it's just fine', then I know that in that case, I just wasted my time being there*", but some directly point to a dilemma: "*In a sense, it would not be a successful consultation, because I could not convince him that it is important to do what. But we also leave the decision, what is made, and the extent of the measures taken to the citizen.*" Apparently, even though the advisors have no explicit incentive to persuade people, and there is no way to assess their performance in this regard, the managers and the advisors understand *prevention* often as promotion of safety measures and appropriate behaviours to be implemented by the advisees.

6 Discussion

The observations illustrate a wide variety of persuasive practices. The advisors differ in the way, they introduce and incorporate SmartProtector in their encounter. However, each advisor greatly relies on the routines they re-enact over and over again in the service encounters and deviates from them only in specific cases, they can enumerate (e.g., advisee being recent victim of a burglary or crime incident). This confirms the routinized character of persuasive practices in BP. Nevertheless, whenever the advisors explain their behaviour or provide arguments for it, they refer to several basic ideas: their view of an (ideal) advisor, their picture of a standard advisee, their position in the organization. This leads to an interesting view of service encounters as collaborative achievements caught between organizational and private opinions, individual and public objectives, as well as between routine and situational behaviours. This chapter offers an interpretation of the data collected while going from the general perspective on persuasive practices, the patterns that characterize the transformation and emergence of persuasive practices and the tensions that govern those processes, to the cumulative view on the standing of persuasion in advisory services.

6.1 Persuasive Practices in Advisory Encounters

The way advisors talk about their advisory practices and about what they do in practice seems to present a contradiction. On the one hand, each house, each advisee, and each door, window, etc. seem to be different and individual. On the other hand, advisors often refer repeatedly to their individual routines, specimens or the tools they present, the stories they tell, and other repeated behaviours. Interestingly, advisory sessions conducted by the same advisor are similar although they do not necessarily follow the same format, but rather rely on the same set of arguments. The advisor who presented a red screwdriver to their advisees did this each time we observed her. The same is true for a range of behaviours which, due to space limitations, could not be listed in the previous chapter. Narratives of how burglars work were popular, corresponding to the practices *j* or *e*, or little thought experiments and anecdotes referring to the very common but unsafe behaviours of many citizens (*k*). They form inventories of the individual advisors' emotional and rational arguments activated throughout the advisory service. A window precipitates one story and a visit to the guest toilet another one: even though each house and each advisee has their individual characteristics, the vast majority of them can be addressed with a set of one-fits-all or, rather, few-fit-many arguments. The existence of those routine arguments confirms Schegloff's (1986) view of practices as ordered,

repetitive and organized sets of interactive, conversational behaviours. Persuasion in advisory encounters happens by applying reusable modules.

To a certain extent, persuasion in advisory encounters may resemble putting together stories, anecdotes, arguments and explanations; however, the activation of the routines varies and considers the external circumstances (as in Extracts 2 and 3) as well as interaction from the advisee (as in Extract 1). Similarly, the advisory encounters are stages of personal contact between the police officer and the citizen, where the introduction on both sides, small talk, and showing interest at the citizen is part of the work assignment as a prevention officer. From this perspective, advisory encounters are highly established collaborative achievements: the configuration of the persuasive practices and the knit that turns the encounter into a coherent experience, acknowledge the individual character of each advisee and each house. This perspective corresponds with the situated collaboration perspective (Suchman 1987; Orlikowski 2008). The framing of persuasive practices as routinized behaviours (and the observations that confirm this assumption) sheds new light on persuasion and makes the field particularly attractive for artefact-based interventions. Designing for persuasion in collaboration means, in light of this insight, designing for a set of persuader's narratives and arguments (e.g., affording them, complementing them with multimodal material) rather than providing artefacts or features targeting directly the persuadee. This contradicts the intuition from PT literature (Fogg 2009; Oinas-Kukkonen and Harjumaa 2009; Oinas-Kukkonen 2010), which sees the persuadee as the primary design's addressee. PT designed for a co-located collaborative situation, such as the BP encounter, only can have an impact if it can address the persuader's behaviour.

The notion of persuasive practices illustrated in the study adds to the insights provided in persuastion and persuasive technology literature. First and foremost, previous literature defined persuasion in terms of a persuasive intent on persuader's side (Chaiken 1980, 1987; Fogg 2009; Stibe and Oinas-Kukkonen 2014). This article shows that persuasion may require a practice-based model: persuasive practices occur in the burglary prevention encounters whether or not the advisors consciously intend to persuade or convince the advisee. Persuasive technology studies often claim a persuasive intent and, to a certain extent, follow the way of technological determinism to argue for the persuasive effect (Fritz et al. 2014; Stibe 2015) – even in situation involving interaction between humans, like in university setting (Stibe and Oinas-Kukkonen 2014). This article, based on the provided results, points in a different direction: it is the embedding of technology in a context that makes it persuasive. Second, it illustrates that not the content, but also the form have a central impact on the persuasion effectiveness. Advisors (and, also, advisees) talk about "the videos", "the questions" and "the graphics" rather than referring to the essence of those elements. This is consistent with an already published analysis (Comes and Schwabe 2016b), but the current study suggests that the form is also essential for the acceptance of specific affordances by the persuaders. In particular, the videos and illustrations get well integrated in the advisory practices, while suggested protection needs questions and priorities get refused. We offer the following explanation: while videos and solution illustrations complement the advisory practices, which have mostly conversational or embodied character, the quite concrete formulation of needs and the direct message of the priority diagram may directly counter the advisor's statements. Consequently, persuasive content in face-to-face persuasion will be appropriated easily if provided in an adequate form. Overall, the current article suggests that framing persuasion as practice offers valuable insights about how to support it with technology.

The identified character of persuasive practices provides potential for fascinating design challenges. Equipping the advisors with specific narratives or thought experiments may be an effective way of introducing new topics into their routine. For instance, SmartProtector's prioritization affordance was not completely used as intended, but many advisors started discussing the topic in their advisory encounters; even the advisor cited, who did not prioritize issues, established an argument she used in many advisory encounters and referred to in the interview. Similarly, the initiation of the discussion on advisee needs was introduced in the training before the roll-out and many advisors used it like another narrative, while preparing space for interaction with the advisee. However, providing the "modules" is not the only way to intervene: the same is true for extending the situation by providing space to "dock" those modules. Using the SmartProtector as an excuse for saying that something may not be the most elegant option gave the advisors a motive for activating the practice as they activate their narratives when seeing a window, door or a phone. Some advisors establish such *dock sites* themselves, whenever they present a specimen or draw a house. In other words, transforming persuasive practice is not about teaching the advisors about persuasion, rather more about providing them with scripts to be reused frequently, and about providing them with events that launch the script.

6.2 Patterns for appropriation of persuasive technology in advisory services: Denying, Censoring, Executing and Accommodating

We observed a set of advisors' approaches towards SmartProtector: (1) *denying*: advisors systematically ignore a specific use, while arguing against it by emphasizing understanding of their own role or the stereotype of the advisee; (2) *censoring*: advisors occasionally ignore a specific usage or reject a functionality, while providing an established explanation for their behaviour; (3) *executing*: advisors systematically enact the intended persuasive practice and assess its effectiveness; (4) *accommodating*: advisors systematically conciliate their pre-existing routines with the SmartProtector functionalities (as intended by the design or in a new, creative way) Whether the advisors *censor*, *deny*, *execute* or *accommodate* them goes far beyond the circumstances and setting of a single situation. This is far more finely-tuned and fluid than the static, holistic views of technology acceptance and utility (Fidock and Carroll 2010). The behaviour patterns presented here also differ from appropriation types or appropriation moves which can be negotiated between users, be it in a co-located (DeSanctis and Gallupe 1987) or distributed scenario (Richter and Riemer 2009). Driven by the need to maintain a good impression on the advisee, the advisor changes her routines and develops new practices in an implicit way. The behaviour patterns become explicit through later reflection, like the tensions that drive the advisors towards one or another behaviour.

Advisors identify different reasons for leaving the established way and deviating from traditional practice and, even, from personal routines. An example is the ad-hoc *censoring* of behaviours that would otherwise form a stable part of one's personal conduct. The most prominent case of censoring among BP advisors was the case where advisors skipped the most emotional parts of their narrative or did not show emotionally loaded multimedia when they encountered a highly emotional or traumatized person; be it a recent victim of burglary or somebody expressing intense fears. In those cases, the advisors reduce the amount of emotional content concerning security flaw identification (see 5.2) or they censor questions inappropriate for a traumatized person (see 5.1). The advisors themselves point to those cases as the ones which require very sensitive conduct and

adaptation to the advisees' pace and emotions (see 5.2), thus confirming that the advisory encounters are strongly contextualized and situated (Fischer et al. 2014, 2017). This also points to the importance of maintaining the *fear of crime* at an appropriate level as a prerequisite for advisee's action (Gabriel and Greve 2003; Bernasco 2014). This situated censorship is different from denial of the emotional content in the advice-giving.

Some advisors systematically omit emotional content (see 5.2), others systematically omit specifying a concrete suggestion (see 5.3). The argument those advisors give differs from the one for censoring. They *deny* formulating a very concrete suggestion and an action plan (be it created together with the advisee or by the advisor only) because they appreciate the negative consequences if such a plan were to be implemented but the burglar still found a way to break in (no measure gives "complete" security and each material, even bullet-proof glass, may break under enough force). Consequently, they deny the practice based on a general assumption about their responsibility. In such situations, the advisors have prepared a set of answers they employ if an advisee asks, e.g., "*We are a public agency and cannot give any recommendation about a particular company – neither a positive nor a negative one, but "so-and-so" provides a list of companies certified by an independent institute*". Similarly, advisors *deny* talking about or asking advisees about their emotions because of their subjective character or because they assume that all advisees share a common emotion they can build upon; namely, moderate fear of burglary crime (see 5.1). Advisors who *deny* specific practices, even when confronted with their colleagues who employed those practices denied even before SmartProtector's roll out, use categorical arguments; they refer to the police as a public institution, to the police officer as its representative, to the default situation and a default advisee. This supports the notion of persuasive practices as a routine sourcing at social and organizational discourses (Schegloff 1986; Scollon 2001), rather than situated behaviour.

However, in many cases, the advisors simply follow the tool's intended practices. In specific cases, this is even expressed in the discussion with the advisee (see 5.1) because the tool/management permit something, they simply carry out this activity. This was often an explanation for collecting the advisee's data or taking a picture of the front of the house to be included in the documentation; those activities essentially do not contradict the basic assumptions advisors have about their work, and are often used to *excuse* the tool and *execute* an activity (see 5.1). Some advisors repeat the excuse and execute sequence whenever they engage in a practice for the first time (e.g., showing a video). We assume, the excuses signalize advisor's sensitivity to scripts and to the fact, that the advisees may expect a specific script (independent of whether the advisees do so or not). Again, this behaviour positions persuasive practices at the centre of social structures and discourses (Scollon 2001) and signalizes that the upcoming behaviour exceeds the conversational and interactional routine, an advisee may expect (Schegloff 1986).

Integration occurs when the advisor *accommodates* her own routines and the action offerings of the tool, so that they fit together. Excerpt 3 in 5.2 illustrates such situation: an advisor, who previously relied on narratives to explain the necessity to cut down trees and bushes in the garden, makes extensive use of the photo-drawing functionality (intended to afford collaborative drawing for identification of strong and weak points concerning security flaws) to make a suggestion of how the garden should look to reduce burglary risk. Apart from gesticulation, the narrative now receives another supporting means of communication: the picture. Similarly, the advisors were able to integrate the videos for motivating the advisees in their narratives, but only a few of them reported using the video functionalities for explaining rather than motivating solutions because

the narratives and routines did not leave space for such illustrations; instead, pictures, gesticulation and verbal explanations were used. This shows that different appropriation forms can co-exist within a single interaction and form a routine (Schegloff 1986). Importantly, the advisees' behaviour did not signalize any negative surprise.

6.3 Dialectics of persuasion in advisory encounters

The advisors – if confronted with a specific situation in the discussion with the observer – tend to explain their behaviour with their views regarding the work as an advisor, the relationship with the organization they represent, the stereotypes of the advisee, and their preferences on how they like to interact with people (being extravert, provocative, etc.). Thereby they point to opposing forces, i.e., dialectic tensions. We argue that similar tensions will occur in other service encounters where persuasion may in fact positively contribute to the quality of beneficent advisory encounters, for instance in doctor-patient encounters (Jungermann 1999; Yaniv 2004b; Swindell et al. 2010). Importantly, the identification of those tensions and divergent practices was possible due to the organizational roll-out of the SmartProtector. Even though the system was extensively tested and developed over several years, also in relation with identified practices, the appropriation in daily practice brought tensions to the surface, which were otherwise hidden.

6.3.1 Motivating vs. enabling practices

The occurrence of such practices as *d* ("accepting needs and fears without discussion"), as opposed to *a*, *b*, or *c*, as well as *s* ("no prioritizing"), as opposed to *p*, *q*, and *r*, points to an essential tension that characterizes the advisor's work: the tension between motivating the advisee and enabling the advisee. Some advisors systematically discount the role of the advisee's emotions and *deny* the action offerings in this connection. They do not engage in a discussion of the advisees' needs or fears and refer to objective rather than subjective facts about a security flaw, thus discounting essential affordances of SmartProtector to motivate the advisee by adding an emotional dimension to a personalized problem and solution description. This happens even though the advisors are aware of the role of emotions as a motivating force. Whereas censoring some activities has an established explanation, advisors who systematically treat advisee's emotions and fears as insignificant or irrelevant to their task tend to refer to a stereotype of a police officer as somebody acting in the public interest, someone who needs to consider data and who should remain down to earth. Furthermore, by doing so they represent a picture of an advisee who needs facts to make the proper decision. Such advisors overestimate the role of rational decision-making. This is contradictory to the available models of human behaviour change (Chaiken 1980; Fogg 2009; Oinas-Kukkonen and Harjumaa 2009; Kahneman 2011; Petty 2013). However, some advisors choose another behaviour – they include basic information on the available solutions but focus on bringing the advisee to do "something", i.e., they engage more in the narratives of known or recent burglary cases. They shape a police officer as somebody with access to exclusive stories that should leave a long-lasting impression on the advisee. By moving the responsibility for any technical decision to the advisee and skilled workers, they seem to underestimate the ability aspect of persuasion. In both cases, we observe that the advisors ignore one of the persuasive dimensions and overemphasize the other one.

This may be detrimental to the persuasive effect. Current persuasion models all agree that emotions (*motivation*) and cognition (*ability*) are necessary for a sustainable response

to a persuasion effort (Chaiken 1980, 1987). However, none of the models makes clear how to balance between emotions and cognition, or, in the context of PT, motivation and enablement (Fogg 2009; Oinas-Kukkonen and Harjumaa 2009; Stibe and Oinas-Kukkonen 2014). Advisors who are successful at balancing between *motivating* and *enabling* examine their stereotype of the advisee at the beginning of the encounter – they invest time in understanding whether a rational or an emotional need underlies the advisee's request for an advisory session. Therefore, they employ an open question or a set of open questions and let the advisee explain their situation; they *accommodate* the list of potential needs to assess the advisee even further and adapt their main message to fit the corrected vision of the conversation partner. Later, they alternate between emotionally-loaded and cognitively-loaded messages. We claim, that this alternation between enabling (rational) and motivating (emotional) messages protects the cognitive and emotional systems of the advisee from overload and keeps both systems awake and receptive to the messages (Kahneman 2011).

6.3.2 "As-is" vs. "to-be" practices

The problem-solving literature sees the process of moving between the "as-is" towards the "to-be" state as the solving procedure (Simon 1978) – persuasion research supports this view and suggests that one of PT's tasks is to support simulation by illustrating the opposite dimensions (Oinas-Kukkonen and Harjumaa 2009). Therefore, SmartProtector offers ways to document or visualize both dimensions. However, we observed that some advisors put more emphasis on "to-be" rather than "as-is". In particular, they "indicate that a particular possible security improvement is missing" and "provide general assessment of a feature as 'insufficient'" (practices *h* and *i*) rather than "clarifying how a burglar might use the current weak point to break in" and "clarifying why present security solutions are incompatible with the advisee's needs and habits" (*j* and *k*). Even though SmartProtector offers extensive ways to describe a problem in terms of "as-is" (cf. Figure 17 right), many advisors define the problem in terms of a missing solution ("this window is insecure because it lacks a grid") and so they use, e.g., the drawing functionality to draw a grid on the window. Consequently, some advisees receive a sparse and general description of the "as-is" state but receive an individualized recommendation; a "to-be" state without understanding the rationale behind it. However, as some advisors claim using SmartProtector made clear to them, that specifying a problem needs more attention and so they changed their routine: they invest more effort in explaining why a problem is a problem. On the opposite side, there are also advisors who *deny* discussing solutions in detail. They routinely use a narrative that explains what safety issue the burglar is looking for, why, and where the advisee's house has those weaknesses. While the narrative is right at the heart of this practice, the "to-be" dimensions plays a secondary role. We claim that the rhetoric structure of an argument or a narrative hamper the introduction of solutions; those advisors make extensive use of, for instance, the problem videos that support their story, but move explanation of the solution to a later time, a brochure, or even to the skilled worker. Interestingly, when confronted with those observations, many advisors consider the idea of "as-is" and "to-be" very natural and would think, their practices actually embrace both – they were surprised when pointed to the contrary instance behaviours. For the advisee, who cannot assess the "as-is", recommendations from the advisor become atomic and fragmented. Without perspective for solution, the listing of problems may overwhelm.

We claim, the imbalance between "as-is" and "to-be" modes results from the expertise, advisors have. Advisors can easily identify the right solution for a situation without much cognitive effort, be it through back-tracking or through inducing the right solution based on previously seen cases in the technical training (Kahneman 2011) – a typical behaviours for domain experts. The advisees neither have access to the collection of similar cases nor are they able to back-track if they do not understand the "as-is" state. Consequently, communication about a problem and solution in an advisory encounter needs to be oriented towards making this connection between the problem and the solution explicit and comprehensible. However, the evolution of advisory services from recommending (Jungermann 1999; Bonaccio and Dalal 2006) towards joint problem solving (Giesbrecht et al. 2016a; Dolata and Schwabe 2017a) requires that both participants establish a common understanding. Advisors, who are best at dealing with the tension between "as-is" and "to-be" when discussing security issues start with a brief problem definition by explaining the burglar's thinking and approach to the advisee. Then they propose a solution or partial solution (e.g., locking handle), and present how a locking handle hinders a break-in. The SmartProtector offers the simplistic metaphor of an issue card with a problem and solution area to afford alternating between the "as-is" and "to-be" dimensions.

6.3.3 Persuasion as decision support vs. persuasion as selling

As has already been shown, some advisors omit essential steps in the proposed persuasive process while leaving out discussion of the advisee's needs (*b* and *g*) or by discounting the role of prioritizing (*s*). Sometimes, they even suggest several alternative solutions without making recommendations. While, as mentioned, this can lead to an imbalance between motivation and ability on the advisee's side, it has another implication for the advisory process: it ignores the interactive, personalized and subjective service dimensions. The discussions about an advisors' personal definition of their job highlights what the conflict is de facto about: the advisors link activities using objective data with *supporting decision* and the activities which have an openly motivating character with *selling*. Clearly, the advisors do not accept the picture of *selling* security; through emphasizing their lack of involvement, they stress their understanding of their role as being providers of decision support. However, when confronted with specific questions, they admit that a successful encounter will lead the advisee to improve their security (even if monetary or rational reasoning is against it: losses due to a burglary incident may be far lower than the investment needed to improve the security). Consequently, they feel torn by the need to make the advisee improve their security and the feeling that they should stay objective and uninvolved.

This tension has a classical dialectic character because the opposing forces originate in the organizational embedment of the advisory encounter (Ven and Poole 1995). The advisors know the expectations of the different sides: the management, society, and the government want to see the number of successful burglary incidents fall; at the same time, the police are expected to provide independent, open, and honest advice. This conflict is typical for non-commercial encounters: whereas in commercial encounters, clients expect the advisor to follow a hidden agenda, a non-commercial encounter should be free of advisors' private interests (Swindell et al. 2010). In the terminology of PT, the typical picture of the commercial selling situation implies the endogenous intent (Fogg 2009; Oinas-Kukkonen and Harjumaa 2009) – the persuader is different from the persuadee and follows own interests. In many situations, the persuasive intent may be autogenous, i.e.,

where the persuadee and persuader are one and the same person who persuades herself to an attitude or behaviour change (e.g., eating less). If the persuasive intent comes from outside the persuader or the persuadee, it is exogenous (Fogg 2009). According to the collected data, the non-commercial encounters, like the BP case, have a mixed character: the primary intent has social or organizational origin (exogenous), but the advisors' statements make clear, that they identify themselves with that, wanting to persuade the advisee (endogenous) and the advisees mostly seek motivation and enablement in this domain (autogenous). This makes the BP case particularly challenging for technology design.

Compared to the most typical PT application scenario (a single user employing an app to do more sports, lose weight, quit smoking, etc.), PT for non-commercial service encounters cannot assume the typical motivation schema, which assumes the initial motivation to be high and takes care of keeping it high, while enabling the user more and more (Oinas-Kukkonen and Harjumaa 2009; Fritz et al. 2014). It cannot also make the assumptions of persuasive technology developed for collaboration between individuals involving monetary incentives where the persuader has immediate interest in changing the attitude of the opposite side (Yang and Kraut 2017). Similarly, emphasizing common interests, common background or personal relation might excellently support teams of peers (Yang and Kraut 2017), but the considered advisory encounters emerged particularly for bringing together people with different backgrounds and interests (e.g., policemen and property owners). Compared with advice giving support technologies (Heinrich et al. 2014a; Heyman and Artman 2015; Giesbrecht et al. 2016a), the SmartProtector adds the emotional dimension of long-term motivation. Previous research focused primarily on enabling the advisee or the advisor by preparing, visualizing or providing specific information (Nussbaumer et al. 2012; Giesbrecht et al. 2016a; Fischer et al. 2017), and addressed the emotional issues like rapport building (Heinrich et al. 2014a) or hedonic qualities of the experience (Novak and Schmidt 2009) only to serve the immediate goals of the encounter (involvement in rational problem solving or recommendation-oriented advice giving) and not to establish a lasting effect.

6.3.4 Stereotype of the motivated advisee vs. the materialist

Whereas the conflicts above are oriented primarily at understanding of the advisor's own role, and how they orient themselves towards the various expectations, there are also conflicts about the advisors' image of the advisee. However, there is more to it than that. We claim that the way humans behave in collaborative situations depends predominantly on their assumptions about the collaboration partners. Conversation-analytical and communication studies about institutional talk demonstrate well the adaptation in dialogue which is a phenomenon that follows from adjusting the assumptions about the other side and stresses the fact that many behaviours are only meaningful if one considers the institutional identities of the collaborators, which normally remain stable (Drew and Heritage 1992a). Stable, but definitely not uniform: advisors explain their behaviour by referring to different, even contradictory mental images of an advisee. Some assume the advisee to be motivated to improve their security from the very beginning, just because they take part in a BP advisory session; those advisors are likely to systematically deny motivating practices but emphasize their specific vision of a solution. Others pre-suppose that an advisee lacks motivation or does not attach the highest priority to the burglary prevention or he may be reluctant to adopt any change; those advisors have a tendency to motivate the advisee more and make the BP attractive to them. Consequently, they use

the system in a way that fits their advisee stereotype. The less time the advisor invests in correcting this stereotype, the larger the risk of falling back into the old routines. If the routines do not fit the advisee's biases and presuppositions, the effectiveness of the persuasive practices will remain low.

However, technology is not just a passive tool in this regard. A system envisioned to support a specific collaborative scenario necessarily implies an image of the collaborators: in our case, the advisor and the advisee. Part of the image of the advisor is his image of the advisee and vice versa. If there is an essential inconsistency in how the advisor sees the advisee and the image of the advisee implied in the system's design, the likelihood of *denying* or *fixing* the intended practices rises. Therefore, it is essential to consider the *implied collaborator* as a structure to be analysed in appropriation studies.

7 Limitations and conclusion

Whereas the extensive qualitative apparatus proves helpful at identifying practices as well as the dialectic tensions that shape them, those insights do not come without limitations. First, the reliability of coding could be further improved by the participation of an additional coder and the computation of the interrater agreement. Second, video recording of advisory sessions would enable a more precise analysis of specific practices, especially in those cases where formulation of concrete statements is essential (cf. practices *a* to *c*). Third, the generalization and external validity of the constructs presented in the current manuscript would benefit from triangulation with another, related case of non-commercial encounters, e.g., advisory encounters on smart or ecological living.

With those limitations, this study makes contributions beyond the context of burglary prevention advisory services. First, it lists and characterizes several persuasive practices occurring in advisory services; they are often routinized narratives or performances rather than improvisations, but their activation is based on the situation. This may resemble other expert-layperson settings like, e.g., student counselling in academia, where the teacher uses a set of standard narratives and sayings to persuade the student to follow a proposed path. Sports trainers rallying their team before a match are a typical example, showing that motivating somebody has a routinized character; similarly, BP advisors also have motivating slogans including the "*Don't be afraid, but…*" phrases or specimens, such as the screwdriver they always carry. This adds to the knowledge on interpersonal persuasion which forms a basis for PT but is becoming increasingly important in beneficent advisory services too. Second, the study explains the patterns involved in the appropriation of a persuasive system in a collaborative situation and the conflicts which drive how the advisors use the system. The advisors seem to deny specific practices which contradict their own understanding and role and their stereotype of the citizen; for instance, they act based on a vision of an objective, an uninvolved police officer or a citizen-friendly advisor. Thereby, they embody and broadcast a vision of public service which they adhere to and, accordingly, they do or do not take on the ideas offered by the technology. This adds to the understanding of using technology in a whole class of frontline situations, whenever citizens encounter a representative of the state. Similarly, this study exemplifies how dialectic perspective can be leveraged to understand the rationale behind specific appropriation patterns. Third, the study presents the design of a system which combines state-of-the-art knowledge of mobile support for advisory encounters with the rationales of PT, crime prevention and joint problem-solving. The analysis of previous practices, not only in terms of chronological happenings but also in

relation to theoretical accounts, helped with understanding what actually happens in the interaction and what transformation is necessary. This lead to design solutions such as affording a problem-solving approach via problem and solution areas combined in an issue card, along with provision of striking videos for motivation and schematic information for enablement and empowerment. The proposed design can be adapted to similar areas including energy-saving encounters, prevention of crime and sexual assault in an office environment, doctor-patient settings, etc., thus being of high relevance to the engineers and designers involved in digitalization of service encounters. Managers and designers also benefit from better understanding of the various factors that influence the appropriation of software among frontline employees. Additionally, CSCW discourse gains extended insight into a specific class of collaboration scenario – advisory encounters. The focus and the results extend the range of previously considered topics (conversation quality, data work, impression management, relationship building) by focusing on persuasion as a part of advice-giving. Since the advisory encounters form a complex form of collaboration (impacted by the organizational embedment, structures of incentives, institutional character of talk and, recently, growing pressure for change and digitalization), we call for further research in this area: for the identification and description of new interesting phenomena, as well as for design and engineering efforts in this area.

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PAPER VIII

A journey of discovery and transformation: Persuasive systems for advisory encounters

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Abstract

Burglary is a crime with major negative economic and social consequences, but an outstandingly low clearance and conviction rate. Hence, preventing it seems more useful than prosecution. Many local police agencies offer burglary prevention advisory services, whereby an expert police officer helps citizens to clarify their individual burglary risks, and to specify possible improvements to home security. Many of these programs, though, achieve only limited success; the most significant limitation being that homeowners tend not to follow through on the security improvement recommendations. Previous studies frame the advisories as transfers-of-knowledge from experts to novices and report incremental improvements. The six-year-long Design Science Research program reported in this manuscript was a journey of discovery and transformation. We precisely and honestly describe a design-as-search process that revealed layers of challenges, and the reasons behind them. Early findings suggested that simple adaptations of prior approaches would not suffice. Each design cycle surfaced new issues that hindered successful digital transformation of burglary prevention services. We reimagined the home security service encounters as joint problem-solving sessions and developed new collaborative work practices fostered by bespoke IT support. We moved a generalizable solution through multiple levels of maturity to provide a system which is able to transform the encounters. Additionally, we provide insights about the framing of advisory services, about the role of routine and practice, and about their connection to IT. We discovered four core requirements associated with successful and sustainable burglary prevention advisories: collaboration, enablement, motivation, and routinization. The contribution has practical relevance, and helps combat a frequent crime, but it also extends the general knowledge on face-to-face advisory services and the design of IT for such a collaboration.

1 Introduction

Burglary is a high-frequency crime with a low clearance rate. In developed countries, burglary has the second highest frequency after theft. In 2015, there were 1.59M cases in the US and 2.39M cases in the EU (Eurostat 2017; FBI 2017). At the same time, US police successfully cleared only 12.9% of burglary cases (less than the clearance for theft, 21.9%, or assault, 54%) (FBI 2017). The German police, who are amongst the most effective in Europe, cleared just 15.2% cases (GDV 2017; Statista 2017). Thus, there is an estimated 10% chance that a residence will be burgled at least once in 10 years, but only every 8th case will be cleared, and the number of cases in which the stolen goods are retrieved and returned to the victims is lower still.

Burglary generates a range of negative issues, ranging from economical losses (approx. 3.6B USD in the US, and 7.9B EUR in the EU in 2015) (Securipedia 2013; Eurostat 2017; FBI 2017), to social problems (perception of insecurity, low social trust, mental trauma), to safety and mobility issues (destroyed safety infrastructure, reduced access due to broken doors) (Securipedia 2013).

In response, governments and public agencies invested in preventing burglary (Bernasco 2014) by, for example, implementing an intelligently-planned presence of police in residential areas (Sommerer 2017), promoting secure behaviors in communities with public pitches, media outreaches and brochures (Barberet and Fisher 2009), and by establishing publicly-funded individual burglary prevention advisory services (Bernasco 2014).

The latter involves technical, hands-on training for police officers regarding home security, who then go into the community upon request to consult with the occupants or owners of a residential property. The police officer identifies safety gaps, i.e., flaws in the building or its perimeter that a burglar could use to gain access (e.g., inadequate door locks, weak windows, or areas in the garden where someone could hide, etc.). She[7] suggests prevention measures that would make the home harder to enter or otherwise unattractive to a burglar.

Burglary prevention advisory services became popular amongst house residents and property owners. Many houses and flats in Germany and Switzerland had critical security weaknesses due to poor hardware (e.g., outdated or weak windows, locks, and doors), ineffective use of the hardware (e.g., leaving guest toilet windows unlocked when nobody is at home), and general misconceptions about security (e.g., "Our cheap car makes it clear that there's nothing here to steal; nobody would even try." – a real advisee's statement during a real burglary advisory encounter observed by the authors).

The general vision for a burglary prevention advisory service went something like this: during an advisory encounter, the advisor and advisee would walk together through the property to identify weak points. The advisor would propose ways to reduce the burglary risk. The advisee would then implement the advisor's recommendations and hire a specialized company, if necessary, to make technically demanding installments. In doing so, the advisee would improve the security in a way that fits his needs, his lifestyle, his property, and his neighborhood, without unnecessary or ineffective purchases. Eventually, the investment would enhance the property's value. By populating this pattern, whole residential areas and regions should become unattractive to burglars.

[7] For a simple gender balance, and for the sake of clarity, we refer to the advisor (police officer) as a female (she, her) and to the advisee (client, citizen) as a male (he, him).

When this study began, though, the impact of the advisory services was unclear. The little available data suggested that, from department-to-department and country-to-country, advisors had widely varying backgrounds, careers, and professional training for the task. Their services varied in quality, emphasis, duration, and recommendations. They had few opportunities to compare experiences with peers in other departments, so ineffective practices tended to persist, and effective practices tended not to spread. It also appeared that citizens might be unlikely to follow through on police recommendations for securing their homes.

This article describes a multi-national, longitudinal, multi-cycle design science research (DSR) study to discover and address shortcomings in burglary prevention service encounters. At first, the project was scheduled to run for a few months and would involve a single police department. Early findings revealed that the transformation of burglary prevention services would require deeper, more extensive research. The study progressed into a six-year-long journey involving 14 police departments belonging to four law enforcement agencies from two countries.

The design objective of the project was: To improve burglary prevention services. The focus of the design efforts evolved from reducing the expert's overhead, to collaborative problem solving, to advisee empowerment and motivation, and finally to routinizing persuasion in advisory encounters. The focus transitions were driven by field results with a series of proof-of-value prototype solutions. Each design/rigor cycle solved a set of proximate problems to reveal a new set of problems behind them. This manuscript summarizes the journey while pointing out the key insights that changed the way we thought about the digital transformation of advisory encounters.

This article makes contributions to crime prevention and to the IS literature. It demonstrates the potential utility of publicly-funded advisory services for preventing burglary and shows ways to use IT to improve those services. When used to empower the advisors, IT can help overcome some limitations of conventional advisory services. It reimagines advisory encounters from a transfer of information from an expert to a layperson, to a collaborative problem-solving engagement in which experts use well-validated routines to foster motivation, enablement, identity, and impression management, and achievement in the layperson.

This manuscript contributes a detailed description of the design-as-a-search process typical for DSR, from the early ideas to the roll-out of a productive system to a user community, and the several steps in-between. It exemplifies the application of the *Last-Research-Mile* (Nunamaker Jr et al. 2015) framework in a particular context – this article offers a rare holistic account of a DSR project moving through proof-of-concept and proof-of-value research to proof-of-use.

The article also contributes to IS in the persuasive systems domain by deriving generalizable solutions integrating collaboration technology, persuasive technology, work practice theory (e.g. outlining the dependency between the behaviors, rationale behind the behaviors, and IT design), and collaborative problem-solving by extending this paradigm into the area of service encounters. As is typical in journeys of discovery, valuable insights emerged at every stage of the project.

2 Background: Project context and rationale

2.1 Burglary prevention advisory services

Given the low clearance rate of burglary cases and their immense impact, literature and practitioners agree that prevention is the right way to fight this crime (Bernasco 2014). Given that burglars tend to be mobile, and come from all social classes and places, it would be all but impossible to prevent burglaries by watching all potential offenders (Gillham 1992). Crime prevention therefore tends to focus on reducing the desire to commit a prohibited behavior by, for example, reducing the number of settings where someone may want to commit a crime (Clarke 1997). Consequently, public agencies and police manipulate the environment, e.g. through more police patrols and more street lighting (Gillham 1992; Clarke 1997), so as to make burglary more risky, less justifiable, and less rewarding. However, these measures are not sufficient. The best approach to reduce residential burglary is to make the interior of the house physically inaccessible to the burglar with, for example, technical barriers that would slow down an offender, and so increasing the risk of apprehension or injury (Gillham 1992). The more secure the property, the less attractive the burglary.

Following this rationale, police agencies in Germany and Switzerland offered free one-on-one advisory services to the citizens to guide them in the best ways to secure their properties. Over time, police agencies discovered a range of problems with the quality of burglary prevention services. Police departments estimated that only about 20-30% of all advisory encounters resulted in implementation of a recommended security upgrade, which is low given the high investment in one-on-one, face-to-face sessions at an advisee's property (Comes and Schwabe 2016b). The services used brochures and other materials to inform citizens, but these became outdated quickly with the rapid advances in the security-products market. Some advisors developed their own print-outs to complement the official material. Sometimes, though, this extra work created more confusion than clarity, as the advisor's materials contradicted the official materials.

A variety of idiosyncratic advising styles emerged. Burglary prevention advisors (or advisor/trainee teams) were "lone rangers," each blazing a different trail through the wilderness with no guidance or feedback from one another. Trainees learned by observing their experienced colleagues, and so repeated both their effective practices and their mistakes. Advisors from different backgrounds emphasized different issues: a former car mechanic, for instance, might emphasize the value of certain kinds of door hardware, while a former investigator might concentrate on the burglars' motives. Service documentation was scarce. Some officers, for instance, maintained Excel lists about their advisory services, while others used carbon paper to make copies of the notes they gave to advisees. Thus, correction and standardization were not possible. Police representatives were aware that they offered an outdated service which might have appeared improvised or provisional.

Burglary attempts did not drop significantly with the introduction of the advisory services (Bundeskriminalamt Deutschland 2016). This put pressure on the responsible officials and police officers to examine the problematic practices, and to open them for improvements.

2.2 Project methodology and partners

We chose the design science research (DSR) paradigm as a central approach for producing both scientific and practically-relevant output. The project addressed a set of real-world

issues identified by the practitioners (police agencies, advisors, and their managers): low implementation rates or no feedback on the actual implementation rates, inadequate or outdated static materials, missing or scarce documentation, as well as differences regarding the quality of the service, its style and focus. Many non-commercial advisory services are likely to share similar problems (e.g. energy advice). Throughout the project, the list of the identified issues was updated and extended by the researchers. To accommodate the incremental exploration of the problems and the solutions, as well as to arrange for any unplanned changes regarding the research partners, the project plan envisaged several iterations. The iterations were intended to include (1) a full design cycle round including building and evaluation tasks, (2) relevance cycle round(s) oriented at identification of problems and opportunities for design, as well as field testing of the designed artifacts, and (3) rigor cycle rounds to integrate and extend the existing knowledge about the identified phenomena or the proposed solutions through regular publications – a full iteration was envisioned to provide advancement in each of the three DSR cycles (Hevner 2007). In other words, an iteration has its primary topic that spans the practical relevance (e.g., an issue or phenomenon X identified in the field), the scientific rigor (e.g., input on the nature of X and output on how X can be approached with IT), and the design (e.g., design and development activities oriented at resolving X). Since this manuscript relies on a topic-based definition of an iteration (rather than a chronological or process-oriented one), the iterations can overlap with regard to time or activities. Nevertheless, for each identified topic (collaborative problem-solving, advisee empowerment and motivation, and routinized persuasion), there was a point in time, when this topic was of primary interest to the whole research consortium. Figure 19 provides a metaphorical illustration of how the iterations interact with each other over time. The central topic of each iteration developed over time based on the insights collected throughout the project.

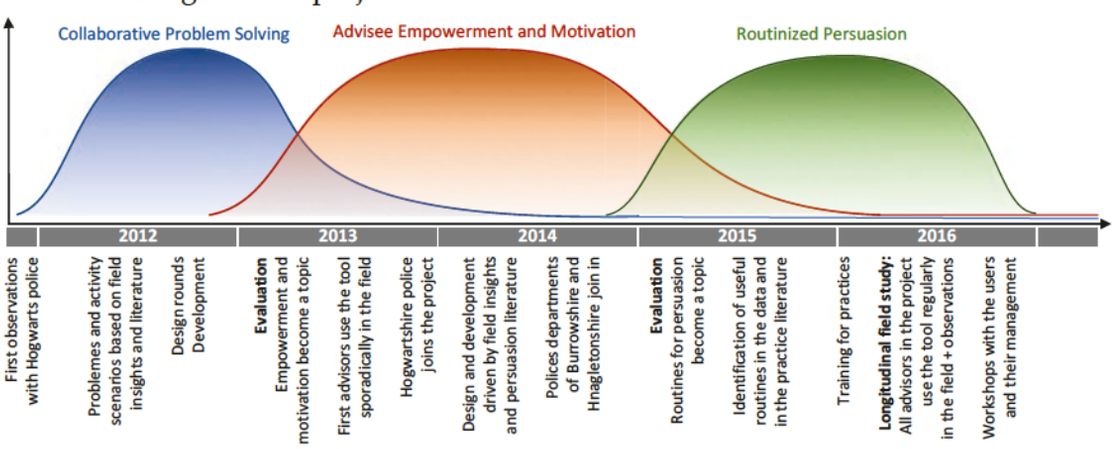

Figure 19 The development of key topics along the project timeline

Each iteration accommodated for issue identification and definition, design and development, as well as summative evaluation and reflection. The issue identification activities involved field work and analysis of previous evaluations to determine interesting and painful phenomena. Through further involvement with the practitioners, as well as the literature, the authors defined the issues and described them in pragmatic and scientific terms to spark the design efforts. The design and development activities employed multiple agile prototyping techniques: storyboarding, paper prototyping, wire-framing, which were embedded in the scenarios according to the scenario-based

development (Rosson and Carroll 2009). Within a design cycle, the prototypes were incrementally reviewed and revised based on intermediate testing sessions, with practitioners employing mostly think-aloud and cognitive walkthrough techniques; with time, more and more improvements were tested in informal field-settings (e.g., advisors using the improvement for singular advisory services). The evaluations towards the end of an iteration employed state-of-the art scientific methods including design experiments (Mettler et al. 2014), and, finally, a longitudinal field study, whereby 16 advisors were equipped with the artifact to be used on a daily basis (a workplace study (Luff et al. 2000)). The analysis of evaluation results, as well as the subsequent reflection, had a twofold role: first, they facilitated the identification and definition of new issues; second, they supported and deepened the understanding of the considered issues, thus extending beyond the knowledge presented in the related works. The reflection finalized the problem and solution exploration for a particular topic and produced insights worth sharing with the scientific community. Overall, the project addressed multiple key topics through a range of analytical, design-oriented and reflexive activities, as well as presented partial results at relevant conferences (Giesbrecht et al. 2015; Comes and Schwabe 2016a, b; Dolata et al. 2016).

We identify three iterations in the project based on the addressed topics: collaborative problem solving (^{C}), advisee empowerment and motivation (^{A}), and routinized persuasion (^{R}). As explained, the key topics emerged throughout the project and were inspired by previous observations as well as impulses from the practitioners. The first project-related tasks were initiated in late 2011 upon agreement of the Hogwarts[8] police department and the authors' university. They included, primarily, identification of problematic issues in the advisors' behavior and potentials for improvement. The insights yielded the first prototype, SmartProtector^{C}, providing components for collaborative problem solving. The prototype was evaluated for the first time in early 2013, with two burglary prevention advisors and 12 test persons acting as residents in an experimental setting. This evaluation attested SmartProtector^{C}'s positive effect on the advisory service, but also unveiled that advisee's empowerment and motivation may determine the implementation rates – these insights gave impulses for the second iteration launched to introduce empowering and motivating components (a.k.a., persuasive components) into the tool's design. The advisors who participated in the evaluation were equipped with their own copies of the system on dedicated devices, so they could test it, not only during design experiments, but also try out its features during real advisory services and report on it. In late 2013, the regional police department of Hogwartshire joined the project consortium, such that the number of affected advisors rose to five. While in 2013 and 2014, the design and development efforts introduced new empowering and motivating components, the project consortium rose, too. In late 2014, state police representatives from two German federal states of Burrowshire and Hangletonshire became attracted to the project at a practitioners' conference and offered to join as partners. SmartProtector^{CA} was adapted to German regulatory situation and knowledge base. The second evaluation was conducted with ten advisors and twenty test residents in early 2015 in Germany, and focused on whether and how the proposed empowering and motivating components affect the advisee. The insights confirmed the potential of an IT-based system to impact the

[8] We use fictional place names derived from a popular book series to assure for the anonymous review process. Only the country names (Germany, Switzerland) depict actual places, the other names are replaced by fictional names (Hogwarts, Hogwartshire, Burrowshire, Hangletonshire, etc.).

advisee's feeling of empowerment and motivation, but also extended the understanding of how empowering and motivation occur in an encounter – namely through persuasive practices. Thus, the subsequent design and development efforts focused the fit between the advisor's practices and the proposed components to support the emergence of persuasive routines. The resulting SmartProtector^{CA+R} and a training concept were then evaluated in another design experiment in early 2016, with twelve advisors and 24 test advisees. The final evaluation prepared the advisors for the daily use of SmartProtector^{CA+R} and launched a six-month longitudinal field study, where the tool was used in the advisory services on a regular basis. At that time, in 2016, the project involved the police departments in Hogwarts and Hogwartshire in Switzerland and state police departments in Burrowshire and Hangletonshire in Germany. The 16 advisors, who directly participated in the project at that time, were responsible for providing burglary prevention advisory services to citizens in highly urbanized as well as rural areas inhabited by approx. 7 million people (the city of Hogwarts, the entirety of Hogwartshire, as well as large parts of Burrowshire and Hangletonshire). The longitudinal field study was accompanied by regular observation, shadowing sessions, and three workshops. While the advisors were implementing SmartProtector^{CA+R} in their daily work, a mid-size software company entered the consortium to develop a professional software product using SmartProtector^{CA+R}'s design and to integrate it with the IT ecosystem of the police departments. Overall, the journey followed the last research mile in applied IS (Nunamaker Jr et al. 2015): the first iteration provided a *proof of concept* by verifying the general potential of improving the burglary prevention advisory services with an IT-based system, the second iteration justified the intervention by proving that it produces *value* in form of more empowerment and motivation on the advisee's side and proposed generalizable empowering and motivating components, and the final iteration yielded a *proof of use* – the advisors established routines, a community of users emerged and a commercial, fully-functional product using the components and training concepts was provided to this community.

3 First iteration: From expert-layperson encounter to collaborative problem solving

3.1 Key issue: knowledge asymmetry

As listed, the police identified a set of surface problems. To identify reasons behind those problems, the project started with observations of advisors' daily work in Hogwarts. Two researchers accompanied two advisors when providing their services and conducted interviews with them, as well as the clients. Those early observations confirmed what police were pointing to: use of brochures, which make it difficult to incorporate the most recent product offerings from the burglary prevention market, missing channels for feedback and collaboration between the advisor and the client after the advisory service, and missing or cumbersome documentation of the recommendation (hand-written notes copied with carbon paper). Additionally, they extended the list of issues and characteristics by pointing to the totally missing documentation of the advisory process itself (what issues were discussed, where, with what outcome), the ad-hoc and spontaneous line of action (what is the next step? how does it follow from the previous step?), as well as the non-explicit rationale behind the procedure and the particular recommendations (some recommendations linked to the problem while others did not).

Considering the above symptoms, the analysis arrived at several inter-related hypotheses explaining why those problems occur. First, the information on the security weaknesses is distributed across the whole property, such that the advisor engages in search and collection of those issues. As an expert, she[9] tends to rely on vast experience and intuition (Kahneman 2011), on where those weak points can exist (e.g., by looking at a house's surroundings outside, the advisor can easily assess whether a window is easily or hardly reachable from outside – when inside the house, she may focus only on windows or a side of the house she considers weak). Since explicating the rationale would require very carious reflection from the advisor on her intuitive decisions, the property's exploration and decision on which points seem weak may appear opportunistic or unordered to the advisees and the observers. Second, the advisor dominates the situation in many aspects: as a domain expert, she routes the exploration and decides on which weaknesses to consider; as a process expert, she governs the topics to be addressed and distributes conversational rights to address them (asks questions, lets the advisee ask questions, etc.); as a solution expert and, simultaneously, the sole author of the documentation, she decides what appears in the final (written) recommendation, in case such a recommendation is composed. Similarly, it may be difficult for the advisee to introduce his concerns during the encounter or to challenge advisor's suggestions beyond providing knowledge unavailable to the advisor and requested by her, such as information on inhabitants' routines. This concentration of interactional rights follows the traditional view on service encounters as expert-layperson collaboration (Bromme et al. 1999; Jungermann 1999; Jungermann and Fischer 2005). Third, various advisors' experiences, backgrounds, skills, and personal preferences lead to differences in emphasis or focus (as mentioned), but also in how the advisors present themselves to the advisees. An advisor puts it very directly: "When I do not feel the atmosphere, or feel like being antipathetic to the client, or the other way around, I try to put things forward to finish it as soon as possible". Apparently, some advisors follow a procedural vision of the service, where the advisory service consists of steps or activities to be completed (like a product to be delivered). Modern view of service stresses rather the recipient's experience and his influence on the service (Prahalad and Ramaswamy 2004a). Overall, the initial investigation, together with the information provided by the police, resulted in the conclusion that the service, seen from the advisee's perspective, lacks integrity and traceability. Much of what the advisor does in the advisory service, and why she does it, remains inaccessible to the advisee (due to the ad-hoc, intuitive, and erratic expert work), can easily be forgotten during the advisory service (due to the information being distributed across the house and the unordered collection procedure), and can virtually disappear after the service (due to inefficient and ineffective documentation).

3.2 Solution approach: collaborative problem solving

A very similar series of problems was previously identified in a range of other advisory services, including investment advisory service (Schwabe and Nussbaumer 2009), town hall services (Schenk and Schwabe 2010), or travel office services (Schmidt-Rauch et al. 2010). In particular, a common topic is the missing or deficient documentation (Schwabe and Nussbaumer 2009; Schenk and Schwabe 2010), as well as the dominating advisor's position and perceived arbitrariness of the recommendation (Schwabe and Nussbaumer

[9] To balance the representation of both genders in the manuscript while keeping it easy to read, we refer to the advisor as a female (she, her) and to the advisee as a male (he, him, his).

2009; Schmidt-Rauch et al. 2010). What is specific about the burglary prevention services is the spatial distribution of information pieces (in the form of singular security weaknesses) across the property. Using IT to improve the documentation, as well as to solve the problem of the advisor's domination, has been extensively discussed in IS and CSCW literature (Schenk and Schwabe 2010; Schmidt-Rauch and Nussbaumer 2011; Schmidt-Rauch and Schwabe 2014): the solution embraces a transformation of an expert-layperson encounter into the collaborative problem solving between the advisor and the advisee. Accordingly, the advisor and the advisee engage in a collaborative effort to solve the advisee's problem or answer his request while relying on both partners' knowledge and abilities (Schmidt-Rauch and Nussbaumer 2011). The first iteration uses this view. It focuses on supporting collaborative problem solving with IT while proposing a specific extension to address the spatial distribution of the information. The following summarizes the concepts.

The development of discourses in the service sciences, as well as in psychology, support the turn towards collaborative problem solving. In the marketing and in the service sciences, advisory service encounters were long considered an element in the selling process or a standalone product offered to customers (Zeithaml et al. 1990; Grönroos 2004): satisfaction with a service was treated like the satisfaction with a product and working on improving a service was like improving a product (Shostack 1982). In this model, the customer was a rather passive figure, driven by a set of normative expectations about an encounter which the service provider needs to balance out, reduce, or respond to using the company's offering (Chase 1978; Zeithaml et al. 1990). Driven by the change of market paradigms towards service-dominant logic (Vargo and Lusch 2006, 2008), research acknowledged the active role of the service recipient (Kelley et al. 1990). Accordingly, he not only provides expectations but also actively co-creates the encounter and co-produces the value for himself and for the provider (Prahalad and Ramaswamy 2004a, b). From a marketing perspective, an advisee that actively participates in the co-creative service encounter is more likely to adhere to the encounter's results and enter a long-term relationship with the service provider (Edvardsson et al. 2011) or even promote it through word-of-mouth (Bolton and Saxena-Iyer 2009). The discourse on communication psychology complements the development in service sciences. Advisory services were often considered expert-layperson encounters (Bromme et al. 1999; Jungermann and Fischer 2005). Accordingly, they were proposed to follow a characteristic knowledge-transfer arithmetic: the expert (i.e., the advisor) makes assumptions about the advisee's knowledge and adapts her choice of wording and communication strategy (observed for architects or medical personnel (Bromme et al. 1999, 2005)). However, this is problematic, if the expert uses the identified knowledge differences to her own advantage (Golec 1992) or if she simply struggles with the assessment of the advisee's knowledge (Fussell and Krauss 1992; Boland Jr. and Tenkasi 1995). In particular, financial advisors were often suspected of using the knowledge asymmetry and hiding risks from their clients – new regulations arrived to enforce collaborative behavior regarding information sharing (Jungermann and Fischer 2005; Oehler et al. 2010; CH 2015). Overall, the discourse on psychology of communication, as well as recent development in service sciences, emphasize the role of collaborative problem solving in advisory services and suggest implementing it in the encounters (Clark and Wilkes-Gibbs 1986; Prahalad and Ramaswamy 2004a).

Advisory service support applications developed along those rationales facilitate co-creative experiences through a range of mechanisms (Schmidt-Rauch and Nussbaumer

2011; Schmidt-Rauch and Schwabe 2014). First, they propose a central artifact of work as the focus of the collaborative efforts. Sourcing at the CSCW's people-artefact framework (Dix 1994), Novak (2009) proposes the creation of an open environment to visualize the client's and advisor's perspectives as a means of overcoming the asymmetries: explicating the problem domain, the solution domain, as well as the relation between the two, was shown to enhance trust between the parties and the overview of the information. Additionally, if the shared artifact of work has interactive features, interlocutors can use visual means to transfer the information through the artefact and manipulate it when collaborating, thus making their efforts more explicit (Novak 2009). The idea of supporting advisory services with IT-based shared artefacts of work to reduce asymmetries through visualizations of problems and solutions has been tested and successfully employed in travel advice (Novak 2009) or financial services (Nussbaumer et al. 2012; Heinrich et al. 2014b). Second, effective solutions for collaborative problem solving intensifies both sides' involvement with issues at hand through making the interaction more attractive. Effective co-creation requires the co-creators to feel stimulated to contribute – providing tangible and natural paradigms for interaction with a common artefact of work generates easier opportunities for contribution (Novak and Schmidt 2009). Third, a seamless documentation, which is possible with an interactive artefact, frees up resources from the advisor to focus more on interaction with the client rather than on minutes taking. A technically easy method (e.g., screenshots of the different states of the artefact of work) can provide documentation of acceptable quality while significantly reducing the time needed for its generation, compared to, e.g., manual note-taking, thus allowing for more fluent interactional organization of the encounter (Schwabe and Giesbrecht 2011). Overall, an IT-based shared artefact of work with problem and solutions spaces to incorporate the advisor's and the advisee's relevant knowledge provides, not only a convenient and common externalization of conversation's focus, but can also stimulate contributions and document them.

3.3 Artifact description

The early iteration of the SmartProtector was inspired by the idea of transforming the burglary prevention advisory services from an expert-layperson knowledge transfer towards the collaborative problem solving. The central artefact was a prototypical system consisting of working software deployed on a 10″ table computer for use during the advisory service encounters. The central features provided by SmartProtector^{C} were oriented at providing open spaces for defining problems and appropriate solutions in a tight collaboration between the advisor and the advisee. Consequently, the tool offers ways to visualize problems and solutions (cf. Figure 20). The problem gets represented by its classification and localization, a short description including an explanation of why the identified security weakness is a problem (e.g., why a weak lock in a window may compromise the security), and photography showing the weak point with markings added by the advisor and the advisee. The visualization of the solution includes a selection of appropriate ways to eliminate this particular weakness chosen by the advisor and the advisee from a predefined list of most common solutions. The problem and the solution of a security issue belong both to the same digital memory card – the problem forms one side of this card, while the solution forms the other side. Consequently, each collaboratively elicited problem and each solution are linked to each other. Furthermore, through the photo and the markings thereon, they are related to a particular place in an advisee's property and to the episode of discussing and drawing together – this

establishes picture-centric collaboration episodes (Giesbrecht et al. 2015). The interaction design affords the identification of a problem and a recommendation formulation that fits this problem – through problem classification and description, they limit the choice of potentially adequate solutions to discuss. Overall, SmartProtector^{C} employs known patterns for designing collaborative problem-solving IT for advisory services while relying on a conclusion by analogy: Travel advisory services, financial advisory services, and town hall services shared many of the issues identified in burglary prevention advisory services. Those issues were previously successfully resolved by providing open spaces for problems and solutions on a shared artefact of work, stimulating content, and documentation. Consequently, those features were thought to improve the burglary prevention advisory services, too. The specific, mobile setting was considered in the design to fit the small device size and leverage its advantages, such as the built-in camera. The details regarding the interface of the tool (SmartProtector^{C}), the evaluation methodology, and parts of the results were previously published by Giesbrecht *et al.* (2015) – the current manuscript extends primarily on the results descriptions and their interpretation that informed subsequent design.

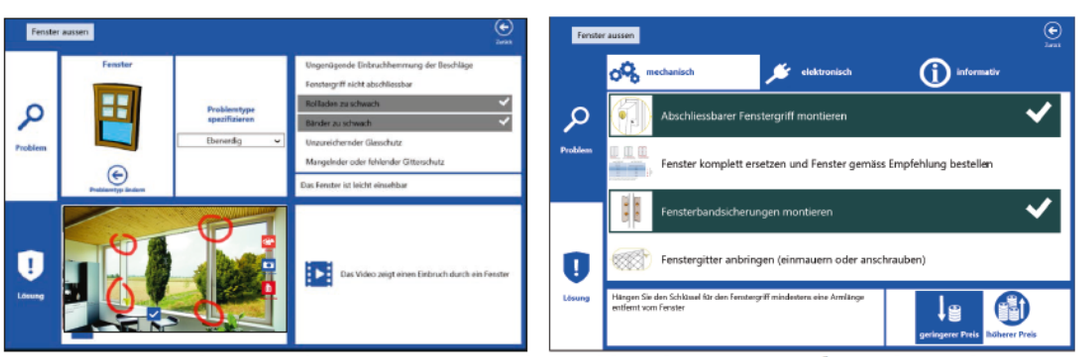

Figure 20 Design elements of SmartProtector^{C}: Left – Problem description; Right – Solution description.

3.4 Evaluation method

To test the system presented above, we designed an experiment to simulate real advisory services. Two consultants from a Swiss police department provided burglary prevention advisory services to 12 advisees at their homes. Each advisee received one conventional and one advice supported with the SmartProtector (short IT). We permutated the order of treatment types (IT and conventional) to balance out any effect that might be ascribed to a particular person or order. Overall, the study followed a within-subject design. After going through both treatments, the advisees were asked for their assessment of the differences between the settings through a standardized survey and an interview. The survey addressed the advisee's satisfaction with the service, including questions on how the advisor addressed the advisee's needs and wishes, the quality of collaboration, as well as the intentions to adhere to the advice. The subjects were recruited among the potential burglary prevention advisees from parents of students of a university course. The test advisees participating in the evaluation were on average 44 years old. Each advisory session lasted for around 45 minutes and was video- and audio-recorded upon agreement from the participants. The footage was later manually coded for each occurrence of a particular security issues, as well as for the solutions proposed to them (including information on the speaker, duration of statements, and their content). The coding enabled an analysis of collaboration episodes and comparison thereof with the advisor's and advisee's self-assessment regarding the collaboration quality.

3.5 Results

The results show SmartProtector's impact on the nature of the encounter: it changes the service character into problem solving. Whereas in the conventional advice, advisors often signalize problems without proposing a solution or the other way around, the advisors tend to provide consistent and adequate problem and solution descriptions when supported with SmartProtector^C. In particular, according to the coding of video footage, 39% of issues mentioned during a conventional advisory encounter do not get reflected in the final solution, while in SmartProtector^C advisory services, the number is only 9%. In other words, SmartProtector^C helps reduce the *loose ends* of an advisory service by more than 75% such that the vast majority of problems indicated by the advisor or the advisee gets their solutions, and there are less "solutions" without a problem (i.e., advisor's suggestions which are not related to the advisee's situation or any security issue). This explicates SmartProtector's objective impact on the problem-solving paradigm in the advice. However, the advisees notice a difference: in the survey, they assess that the IT-supported advisory service is better adapted to their particular individual situation than the conventional situation (6.5 vs. 6.2 on a 7-point Likert scale, significant with $p<0.05$). They also express satisfaction with the SmartProtector as a tool (6.5 on a 7-point Likert scale) and they acknowledge the role of visualizations during the encounter as especially helpful for comprehending the problems and the adequate solutions (6.35 for visualizations during the advisory service as opposed to, e.g., 5.8 for receiving and reading documentation from the IT-supported advice). Nevertheless, the numbers do not show that the improvements regarding the problem-solving nature of the encounter influence the overall quality and intention to consider the recommendation in any significant manner (6.7 for conventional setting, 6.65 for IT setting on a 7-point Likert scale). Consideration from the interviews provides suggestions on the interpretation of those numbers.

The advisees acknowledge the advantages resulting from a clear problem-solution paradigm throughout the encounter, and the fact that the information is collected along those dimensions. They value the fact that the clear division into problem and solution, as well as linking between them, demands less cognitive resources from them as laypeople, which can be employed for more important tasks: "I knew directly when the consultant opened a post-it card that the information would be linked with it [...] I could concentrate on *understanding* the solution." The test advisees ascribe an activating effect to the pictures as an artefact of work: "The pictures remain in your head, it's easier to follow, and so if we make some markings together […] it's better if you can see it than if you can hear it […] you then can sit down together and look through the things, discuss the options together, and so on." However, many advisees do not see an essential difference between the settings if it comes to their intentions to adhere to the recommendation: "Oh… it's difficult to say […] The recommendations overlap […] Now it's up to me to see what I can do about it. I knew before, there were things to improve, but in an advisory service it becomes more immediate, independent of its type." No advisee states that he was likely to do more for their security because of any feature of the SmartProtector or the SmartProtector-supported advisory setting, even though many see significant improvements compared to conventional setting regarding the documentation and picture-based interaction in the conversation. The advisors also acknowledge the positive impact of the pictures on their advisory services: "I really like the photographs with the remarks. They remind me of the conversation [...] I was able to repeat all the details when discussing the solutions." However, the tool was considered detrimental to

a fluent conversation – one of the advisors puts it like this: "When I wrote information in the tool, I had to interrupt the conversation." The advisees referred to such situations when assessing the SmartProtector setting as less "face-to-face": "Hmm… I would say, I preferred when the advisor was talking to me as a person, otherwise he was focused a lot on the data and could less attend to my personality and my personal issues." Others noticed that they contributed more to an IT-supported service and were more active during it, but did not have the feeling of "receiving more" from the advisor – they did not experience more stimulation to implement the recommendation. Overall, the advisors and advisees notice improvements regarding documentation, visualization, and a clearer focus on problems and solutions, but complained about the dominating character of the data in the IT; they did not see the difference regarding effectiveness of the encounter as to whether it enhances the likelihood of implementing the advice.

3.6 Insights

The switch from knowledge-transfer oriented expert-layperson encounters towards co-creation services promises essential improvements (Prahalad and Ramaswamy 2004a, b; Bolton and Saxena-Iyer 2009; Edvardsson et al. 2011). IT was often proposed as a way to establish a co-creation atmosphere through providing open spaces for collaborative work between the advisor and the advisee (Schmidt-Rauch and Nussbaumer 2011; Schmidt-Rauch and Schwabe 2014). In particular, dedicated IT was claimed as a possible way of structuring the co-creative effort around the problem and solution domains (Novak 2009), thus giving both interlocutors a possibility to explicate their contribution and reduce the asymmetries between them (Golec 1992). The results of the first iteration's evaluation provide a mixed picture: The features of SmartProtector^{C}, in particular, the possibility to collaboratively draw on photographs, are very popular with the advisees and with the advisors. They create opportunities for new behaviors to emerge and those practices are accepted by the advisors and the advisees. They enhance the engagement of both sides into the encounter and support seamless documentation, such that parts of the documentation now emanate from the advisor's actions and does not require extra documentation effort. Additionally, this picture-centric collaboration supports a complete, more immediate, and attractive final elaboration of the recommendations. The overall problem-solution structure of the material presented and produced during an advisory service helps the advisees follow the links between problems and solutions, as well as makes the problems clearer. The observed picture-oriented behaviors of both interlocutors are likely to become routines and lead to a lasting transformation of the advisors' practice.

However, those new behaviors did not suffice to outperform the conventional advice: they lacked focus on the person of the advisee. Given the observations, we propose the following interpretation: The SmartProtector^{C} encounters had a professional character, with collaboration oriented at essential and structured information about the central matter (the particular security weaknesses and ways to eliminate them). Both parties felt stimulated by drawing together, and could contribute to the problem and solution definition, as many advisees described in the interviews. This confirms IT's potential to make people identify themselves with what is going in the encounter (Novak and Schmidt 2009). The willingness to contribute was additionally supported by the simple-to-follow problem-solution paradigm extended with additional visual means. However, what the advisees were missing was a focus on them as persons who need to approach the identified security weaknesses after the encounter. To do so, they feel that they require

additional capacities, which go far beyond the identification of the problems and the adequate solutions. Since the tool positioned the technical matters of security (windows and door locks, grids, etc.) in the center, and afforded collaboration on these issues, the encounter lost sight of the human aspects (i.e., capacity to stem the implementation process). This points to an essential difference between the current domain and other domains, like the financial or travel advisory service (Schmidt-Rauch and Nussbaumer 2011; Schmidt-Rauch and Schwabe 2014). Whereas in the latter cases, the advisee is not required to mobilize any individual resources to follow the recommendation (in case he has enough money to make an investment or to buy a trip), implementing the burglary prevention advice requires extended and individual engagement with this topic after the advisory service (Bernasco 2014). Overall, SmartProtector^C transformed the burglary prevention advisory service into a collaborative problem solving, thus providing a *proof of concept* for effective behavioral changes in burglary prevention encountered through digital features. At the same time, it was not enough to enhance advisees' beliefs about their capacity to follow the recommendation or motivation to do so. Thus, we continued our journey.

4 Second iteration: From collaborative problem solving to advisee empowerment and motivation

4.1 Key issue: Missing focus on the advisee as implementer

The interpretation of the results from the first iteration shows that many of the issues identified by the police departments, the advisors, and by the researchers during the early observations, could be resolved through a system inspired by the analogy to other advisory services. SmartProtector^C transformed the way the information gets collected, explicated, collaborated upon, and documented during the encounter: the advisees could better understand how the particular solutions respond to the identified weaknesses, the advisors had a better overview of what they discussed and what needed to be approached, and finally, all the information produced throughout the service was seamlessly documented. However, the advisees' statements pointed to an important issue: even though they collaborated upon the solution, they were missing a directed consideration of them as the ones responsible for implementing the solution. This makes apparent that things happening within an advisory encounter do not directly map to what happens after it: stimulation to participate in a conversation does not imply stimulation to act after the advisory service; individual contributions to a collaborative effort do not imply that the overall recommendation gets individual; understanding of particular relations between problems and solutions does not imply the understanding of relationship between oneself and the tasks to be completed. The advisee's opinions make clear that neither their feeling of having more capacity to address the security issues, nor their feeling of actually willing to invest time and money into enhancing the security, would be impacted by SmartProtector^C. Since the police departments explicitly pointed to the issue of low implementation rates, and given the first iteration's results, the second iteration was planned to reflect upon the collected feedback and offer new design components to address the issues.

A theme occurring across collected opinions was the individual advisee's capacity to implement the recommendation. One's beliefs of how well one can execute actions required to deal with a situation is referred to as self-efficacy (Bandura 1997). A person

who lacks self-efficacy not only requires more capacity, but also the belief that they have the capacities necessary to fight the problem. In case of the burglary prevention advisory service, an advisee may have the capacity (time, money, problem, and solution understanding) to significantly enhance his property's security, but misrecognition of those individual capacities may cause resignation.

Another topic identified in the data explains why the advisees lack the intent to implement the recommendation is how emotionally affected they feel by the risk of burglary. Emotions are core motivations for human action (Fogg 2009), i.e., they direct human behavior and stimulate engagement in activities (Kahneman 2011). In particular, if the advisee considers burglary risk an irrelevant factor that "leaves him cold", the motivation to prevent the burglary will remain low. Consequently, the burglary prevention advisory service is not just about teaching and stimulating the advisee within the encounter, but also beyond the encounter, to afford the implementation of the collaboratively produced recommendation. A concept that links the empowerment and the motivation, and their longitudinal effect, is persuasion (Chaiken 1980; Fogg 2009), i.e., interaction oriented at changing the behavior or attitude of the persuadee without any form of force or deceit. Empowerment and motivation are both central for persuasion to succeed, therefore, the second iteration focused on persuading advisees by empowering and motivating them to change without affording deception or coercion.

4.2 Solution approach: empowering and motivating the advisee

Empowerment is the process of gaining strength and confidence to do something, and in particular, to control one's own life (Ozer and Bandura 1990). Self-efficacy describes one's own assessment of this capacity (Bandura 1997). Self-efficacy was shown to impact a person's actions in many areas, including health, fitness, or education – if a person (patient, student) does not believe he is able to fight an unwanted state or improve his behaviors or environment, he is much less likely to succeed (independent of the actual capacity) (Bandura 1997). The other way around, making people believe in their capacity is a way to engage them in improvement (Ozer and Bandura 1990). Burglary prevention builds upon the concept of an empowered citizen and empowered communities to reduce burglary risk. For instance, working with burglary victims, who cannot cope with the consequences of burglary, requires the police to compensate for the missing victim's resources and heighten the victim's belief, that there are ways to eliminate break-in consequences (Bogaard and Wiegman 1991). Likewise, empowered communities and individuals (i.e., those who believe that they can make their environment safe against burglary) are less likely to become victims of crime (Barlow and Decker 2010). Self-efficacy supports engagement in safety behaviors, like approaching strangers in the street and asking whom they are looking for, or establishing trustful bounds with neighbors (Erete 2013). The bottom line is to make citizens aware of their impact on safety in the property and in the neighborhood and show them how to execute this impact.

Motivating someone is the process of causing someone to have enthusiasm and interest in some activities (Touré-Tillery and Fishbach 2014). Emotionally loaded content referring to fears, hopes, pleasure, or acceptance are seen as successful motivators (Fogg 2009) and make people personally involved with things under consideration (Leippe and Elkin 1987). Highly involved individuals are likely to take a conscious decision and sustain it for a long time, while people who lack involvement take decisions based, e.g., on heuristics, and are likely to change them with time (Petty and Cacioppo 1986a). In other words, to persuade the advisees to actually follow up on the recommendation and

adhere to it, the advisor needs to address the advisee's emotions and make him associate positive thoughts with the target state and negative emotions with the current state. Literature on burglary prevention supports this view, to a certain degree. It points to the *fear of crime* as an effective emotion to motivate people to change their risk-related behaviors and attitudes. However it also suggests that citizens with an outstandingly high fear of crime suffer from it and, for instance, reduce social contacts with their community, which make them even more vulnerable to burglary (Rountree and Land 1996; Gabriel and Greve 2003; Barberet and Fisher 2009). Overall, persuasion in burglary prevention advisory encounters can generate and leverage advisees' emotions, such as fears and hopes, to involve the advisees with the issues at hand and produce a conscious response.

Persuasive technology (PT), a separate, increasingly popular discourse at the intersection between IS and HCI, handles the role of IT for persuasion. PT focuses on IT systems developed to make the user change their behavior or attitude without coercion, force, or deceit (Fogg 2009). Consequently, the design of PT makes the persuasive situation explicit, while other approaches (such as digital nudging) try to approach subconscious processes (Oinas-Kukkonen 2013; Weinmann et al. 2016). Since persuasion in PT relies primarily on explicit reinforcement in favor of the persuadee (e.g., a cigarettes or alcohol addict who wants to fight the addiction), the PT suggests directly approaching the self-efficacy and capacities, as well as the emotions of the advisee (Fogg 2009). Traditionally, PT focuses on supporting a single user while providing automatically generated persuasive content (computer-human influence), or by preparing and providing content generated by other users (computer-mediated and computer-moderated influence) (Stibe 2015). In this context, PT applications (e.g., fitness apps) enhance self-efficacy by incrementally adjusting short-term goals and by informing the user about his achievements (e.g., "you've run more than 200 miles in the last month"), by making the available or needed resources more explicit (e.g., "improve your body in 20 minutes a day"), by strengthening the hope (e.g., "looking like an athlete is just 100 steps away"), or by emphasizing the negative consequences of physical inactivity (e.g., "no need to be ashamed anymore of your belly at the beach") (Fritz et al. 2014). In other words, the user shall receive awareness of what to do next (goals), how (practice), and what for (rewards) (Fritz et al. 2014). Only recently, the PT community acknowledged the potential of IT to support the face-to-face persuasion (Dolata et al. 2016). Nevertheless, it remains open how technology can support the advisor at empowering the advisee and at addressing his emotions. Furthermore, persuasion in case of burglary prevention is different from the previous application areas of PT (fitness, saving of natural resources, and education).

4.3 Artefact description

As explicated by PT, digitalization offers ways to empower and motivate the users in various directions. In the case of burglary prevention advisory service, it would include emphasizing the capacities to address the security issues and deal with the advisee's fears and hopes to motivate them. Inspired by this, SmartProtector^{CA} provides extended options for addressing self-efficacy and motivation. Regarding self-efficacy, it supports clarification of what should be done next and how, as well as essential information showing that taking the action is easy. Regarding the motivation, it offers means for collaborative explication of advisee's fears and their redirection, as well as identify hopeful solutions. SmartProtector^{CA} is not like others PT systems: it does not directly

address the persuadee (i.e., the advisee) but provides tools for the human persuader (i.e., the advisor) to make her persuasion more effective and more explicit.

Comes and Schwabe (2016a) describe the efficacy-related features of SmartProtector^{CA} in great detail, such that we repeat only the central points here. The tool's design considers that there are two general types of hardware-related security improvements: (1) quick and easy tricks and (2) professional upgrade. To prevent burglary through a sliding balcony door, the resident can place a standard wooden lath in the guide rail, which makes opening the window impossible. Or, alternatively, he can hire a company to update the window's hardware. Whereas the first solution is cheap and easy, the second one is far more convenient, looks better, and is certified. For the first category, SmartProtector^{CA} provides explanatory illustrations showing how such improvements can be made and what the rationale behind them is. The second category includes complex hardware works affecting the locking mechanisms, which requires a certified specialist. SmartProtector^{CA} provides graphics and animations showing technical details of complex solutions to be used during the service, and also offers a list of the certified restoration companies in the region that install exactly those improvements. Finally, it generates a final documentation from the material collected in the encounter. The documentation produced by SmartProtector^{CA} was intended to empower the advisee beyond the encounter itself: he can share the documentation with the craftspeople, specify the scope of works with them based on the collaboratively identified priorities, and explicate his requests more precisely using the texts and visuals from the collaboration with the advisor (cf. Figure 21 – Left). Having a structured, personalized, and obviously officially-looking recommendation was assumed to bolster an advisee up when negotiating with restoration companies, family, and neighbors. Through a combination of documentation with visualizing arguments during the encounter, the advisee should sense more strength and potential in approaching the burglary risk.

Comes and Schwabe (2016b) discuss the design elements related to the motivation. Primarily, driven by previous research showing the emotional appeal of vivid multimedia (Brosnan et al. 2006; Schneider and Kauffeld 2011) and their impact on motivation, SmartProtector^{CA} offers videos and pictures to be shown by the advisor during the service. The provided multimedia has various contents: there are videos showing how a person opens an unsecured window with a screwdriver or uses simple means to open a locked door, to appeal to the emotion of fear, and there are videos and pictures illustrating how a person fails to open properly secured doors and windows to appeal to hopes. The "fear" videos were chosen to illustrate plausible and true information, and are not simply emotional horror stories: they rely on the police's experience of how long it takes to unlock a window or a door of the most popular, second lowest security class (up to 60 seconds), what are the typical sounds generated thereby (low-volume, mechanical sounds, rather than breaking glass), and what tools burglars use (a screwdriver or a stone, rather than a crowbar or glass cutter). The advisor can then incorporate this information into the service to make it more vivid and credible, thus causing a previously unconvinced advisee to feel fear. On the other side, SmartProtector^{CA} offers multimedia for directing the fear by sparking hopes and trust: the videos illustrating the effects of appropriate security mechanisms illustrate that the issues can be well addressed with relatively affordable means. Additionally, SmartProtector^{CA} provides material for explicating advisees' fears and hopes in the form of most common issues the advisees may raise during the advisory service. Consequently, the multimedia used in SmartProtector^{CA} addresses the emotions which have the most impact on advisee's security behaviors: fear of burglary, as well as

hope and trust that the security improvements and safety behavior will prevent crime from happening.

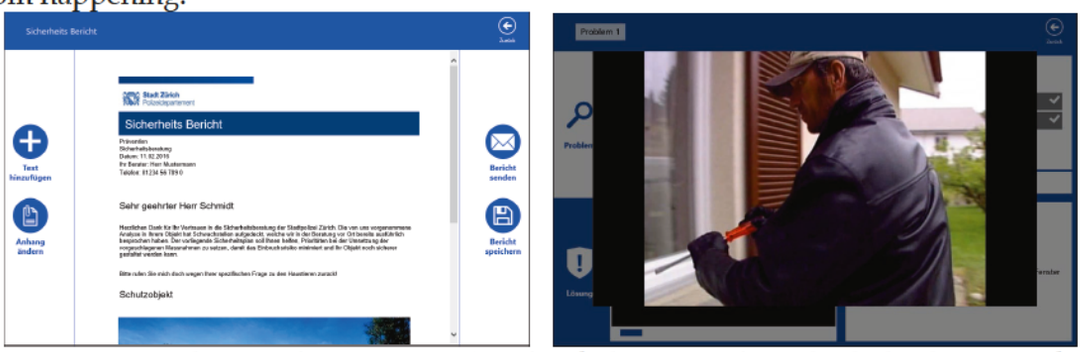

Figure 21 Design elements of SmartProtector^{CA}: Left – The beginning of an individualized report; Right – Video of a burglary incident.

4.4 Evaluation method

The objective of SmartProtector^{CA}'s evaluation was to show that it effectively supports the advisor at improving the advisees' empowerment and motivation. Thereby the system would generate an added value to the advisory service, in line with the *proof of value* (Nunamaker Jr et al. 2015). To reduce external impacts on the measures and separate the central factors, we decided to evaluate SmartProtector^{CA} in a slightly more controlled manner than before: we ran a design experiment (Mettler et al. 2014). To prepare the advisors for use of SmartProtector^{CA} in practice, they received a whole day of hands-on training, where they could try out the system's functionalities and simulate an encounter with their colleagues. The actual experiment took place in February 2015 and involved ten police advisors from Germany and twenty test advisees. It was conducted according to a scenario: the advisors acted as if they were providing the service in their usual manner, and randomly chosen test people recruited through social media acted as homebuyers and advisees. Following the scenario, the homebuyers, together with their advisor, visited two homes they would be about to buy. The advisor's role was to advise the homebuyers on how to make those properties more secure upon purchase: in one home, the advisor used the SmartProtector to support the advisory encounter, in the other one, he provided conventional advice. To eliminate the order effects, the sequence of treatments was randomized for each advisee and for each advisor; also, the houses they visited were randomized, such that each advisor visited a house only once. The experiment was conducted on a permanent prefabricated houses exhibition – the houses offered a standard anti-burglary finishing. All sessions were camera-recorded. After each treatment, the test participants were asked to fill out a survey, including standardized scales to assess whether they understood the status quo (problem domain) and the recommendation (solution domain) (Nussbaumer et al. 2012), as well as their empowerment, intention, and motivation to implement the recommendation (Baek and Morimoto 2012; Touré-Tillery and Fishbach 2014), and the overall persuasiveness to do so (Lehto et al. 2012). The advisors answered questions related to the client empowerment (seven items; adapted from Giesbrecht et al. (2016a)) and to how they assess the encounter's influence on advisee's motivation (two items, self-developed). Additionally, each advisee and each advisor were interviewed upon their participation in the experiment to understand the rationale behind their preferences. Overall, the within-subject design of this design experiment allowed each participant to compare the settings

(with and without SmartProtector^{CA}) regarding how empowered and motivated they considered themselves after each treatment.

4.5 Results

The experiment results make clear that the features of SmartProtector^{CA} have the potential to afford behaviors which make the encounter motivating and enabling. In general, the advisees assess the SmartProtector-supported advisory service as significantly *more personally fitted to them* (Lehto et al. 2012) (4.85 for IT-supported vs. 4.55 for conventional advisory service on a 5-point Likert scale with $p < 0.05$ in a one-sided paired t-test with t=1.9). Regarding the self-efficacy, the advisees assess that the SmartProtector-supported service *enables them to put the order in hand to install a burglary protection tailored to their needs* (Baek and Morimoto 2012) better than the conventional service (4.9 vs. 4.74 on a 5-point Likert scale with $p = 0.1$ in a one-sided paired t-test with t=1.6). When asked for direct comparison between the settings, twelve of twenty test advisees answer the question *'which of the advisory settings has enabled you better to implement the recommendation?'* with *definitely IT* or *rather IT*, while six test advisees remain indifferent (significance in one-sided t-test: $p < 0.05$, with t=2.7 and avg=3.7, where 1 stands for *definitely conventional* and 5 for *definitely IT*, H_0=3). Similarly, nine test advisees answer the question '*which of the advisory settings makes the status-quo situation more comprehensible?'* with *definitely IT* or *rather IT* with eight indifferent test advisees (significance in one-sided t-test: $p < 0.1$, with t=1.4 and avg=3.35, H_0=3), as well as eleven participants respond to '*which of the advisory settings makes the recommendation more comprehensible?'* with *definitely IT* or *rather IT* with seven indifferent voices (significance in one-sided t-test: $p < 0.05$, with t=2.65 and avg=3.65, H_0=3). The advisors also confirm that using SmartProtector^{CA} can enhance the advisee's ability to implement the recommendation: their assessment of client empowerment (Giesbrecht et al. 2016a) shows that the SmartProtector^{CA} encounters prepare the advisee better to implement the recommendation than the conventional service (4.29 vs. 4.05 on a 5-point Likert scale with $p<0.05$ in a one-sided t-test with t=1.81). Overall, the questionnaire's results suggest that the advisees do not only understand more about the problem and the recommended solution from the SmartProtector^{CA} services, but also feel more enabled to follow the recommendation or are perceived as such by the advisors.

Regarding advisees' motivation, the results are also positive. Overall, the advisees' motivation to implement the recommendation (measured with a four-item instrument (Touré-Tillery and Fishbach 2014)) is higher in the SmartProtector^{CA} encounters than in the conventional ones (4.74 vs. 4.45 on a 5-point Likert scale with $p<0.05$ in a one-sided paired t-test with t=1.7). Additionally, when asked *'which of the advisory settings has motivated you better to implement the recommendation?'*, only one advisee answers with *definitely conventional*, seven participants are indifferent, 8 persons answer *rather IT*, and 4 subjects say *definitely IT*. The SmartProtector^{CA} encounters outperform the conventional service in terms of the aesthetics of the persuasive interaction (attractive aids, appearance, and visual experiences) (Lehto et al. 2012). The advisees rate the aesthetics of SmartProtector^{CA} encounters significantly higher (4.8 vs. 3.9 on a 5-point Likert scale with $p<0.001$ in a one-sided paired t-test with t=3.9). The advisors also acknowledge that SmartProtector^{CA} enhances their ability to motivate the advisees: using a two-item instrument on a 5-point Likert scale, they assess their ability to motivate the advisee with 4.5 in SmartProtector^{CA} services and with 4.1 in conventional ones (one-sided paired t-test,

$p<0.01$, $t=2.43$). Overall, the above results suggest that SmartProtector^{CA} offers adequate means for motivating the advisees.

The above suggests that the SmartProtector^{CA} services successfully address the motivation and the ability of the advisee to tackle security-relevant issues in their property. Consequently, the overall rating should identify the IT-supported services as more convincing, and therefore more persuading in overall terms. However, when asked for the advisory session that convinced them to implement the advice, the advisees do not have a clear favorite (7 advisees are indifferent, 7 choose *rather IT* or *definitely IT*, and 6 choose *rather conventional* or *definitely conventional*). Similarly, the test participants notice only a negligible difference when it comes to how much they *feel urged to take up the security improvements* upon receiving the advisory session (4.65 for conventional advisory service and 4.75 for IT-supported advisory service on a 5-point Likert scale without a significant difference, $p>0.2$). The analysis of interviews shows how the advisees experienced the interaction with the advisors and points to some central insights, which explain this inconsistency.

The opinions collected throughout the interviews with the test participants, and with the advisors, explain the results and, particularly, point to the shortcomings of SmartProtector^{CA}-supported advisory services. Many advisees acknowledge the positive sides of the documentation and clear priorities. An advisee summarized her general experience: "I learned a lot. It was very informative, as to how I can protect my house better." In this context, they see the advantages of SmartProtector^{CA}: "It was easier to see how things belong together […] It was maybe because he just clicked on things and then a new picture or piece of information appeared, while in the conventional you have to go through it on a brochure or on a piece of paper. It's clear, on the paper you've got almost the same things, but it's all more cumbersome and sluggish to get the pieces together." Comments like this emphasize the advantages of SmartProtector^{CA} for the process of generating a comprehensive recommendation, while others stress the role of the outcome: "The biggest difference between the two settings was for me the result of the advisory service – in the first, there was an email with all materials and steps to be taken in one place; and in the other one, too many different brochures…" Similarly, many advisees value the multimedia input they received through SmartProtector^{CA} during the service: "If there's the visual channel, it's easier to grasp the things, for instance how much time a burglar needs, how fast they are. It appealed to me, the things got more realistic, I'd say." However, when asked for a direct comparison between the settings, many advisees point towards conventional advice as the one that they responded to more intensively. One advisee puts it the following way: "I think the conventional advice leaves a better impression. I had the feeling the advisor was freer in the conventional service. You know, she was moving more, she used her body more, she could complement and accompany the content better with add-ons and gestures. (…) With the tablet, I got the feeling, there were breaks, and what she did with the tablet sometimes did not fit in the whole story she was telling." The overall tendency is adjacent to the questionnaire's data: the advisees liked the single features of SmartProtector^{CA} like videos or documentation a lot, but the advisors' routines in the conventional services produced a more coherent and lucid experience, such that the overall impression equilibrated.

Comments from the advisors are in line with advisees' opinions. Advisors were not always sure how to combine their routinized behavior with the features offered by the tool, despite the hands-on training they had received: "I did the service the way I've been doing it for seven years now. I tried to incorporate the tablet and the information from it

therein. However, I cannot assess the outcome. I don't know what arrived at the advisee […] It would be interesting to get some feedback on where one can improve something and what was good. I must say, I hang in the air about it." Other advisors were even reluctant to use some of SmartProtector^{CA}'s features, like prioritizing: "In the real world, you cannot say A is more important than B – it's the advisee's role to decide what he should do next. […] We are not there to sell anything." On the other hand, some acknowledge the fit between their routines and the features of the system: "When I tell my story, you know, how the burglar creeps about the house, I can use the video to show it […] People believe me easier, they see it's not like 'boom, boom, boom' and I don't need to explicate everything." The collected opinions from the advisors and from some advisees have a common topic: routines and freedom to follow them as a way of making a specific impression on the advisee.

4.6 Insights

The second iteration makes clear that SmartProtector^{CA} can provide additional value to the advisors and to the advisees. This adds to the positioning of IT in an advisory encounter: it is not just an instrument for enhancing the problem-solving during the encounter (Giesbrecht et al. 2016b, a), but a tool with direct and possibly lasting impact on the advisee, his abilities or emotions. For instance, using dynamic illustrations in a personalized context or providing documentation in form of a plan for action have the potential to empower the advisee, thus supporting burglary prevention. Only a citizen who is in control of his capacities to fight crime can effectively approach the risks and contribute to a safer environment (Bogaard and Wiegman 1991; Barlow and Decker 2010; Erete 2013). This supports the general assumption that enhancing people's self-efficacy in collaborative encounters can be reached through dedicated, goal-oriented IT. This extends previous results on the nature of self-efficacy from behavioral and psychological studies (Ozer and Bandura 1990; Bandura 1997) and calls for further research on other design concepts and components to support self-efficacy in collaborative settings, beyond the actionable documentation and explanatory illustrations. Regarding the burglary prevention case, the significant difference regarding advisees' efficacy, as expressed by the advisees and the advisors, points to the fact that previous, conventional services lacked action-oriented elements to put the advisee in the state of actually doing something about home security or those elements were less effective than the ones implemented with SmartProtector^{CA}.

While the value of a good documentation, comprehensible illustrations, and other action-oriented components (lists, checklists, etc.) gave the advisees the feeling of competence to address the burglary risk, the videos addressed their emotions, as they often explain in the interviews. Using vivid illustrations to generate emotions has been employed for centuries in various contexts, and is more wide-spread today in marketing and politics. However, the videos employed in SmartProtector^{CA} have nothing to do with horrors or thrillers – they depict actual, predominant behavior of burglars. This is important – sparking fear, especially fear of crime, can be easier than directing it in a way that results in security improvements (Rountree and Land 1996; Hale 1996; Gabriel and Greve 2003; Barberet and Fisher 2009). Therefore, SmartProtector^{CA}, as well as the advisor, flank the videos' content with explanations, as well as discussion of needs and fears or hopeful messages (also in the form of solution-related videos) to prevent the ineffective or detrimental fears. Since emotions are central for motivating someone (Touré-Tillery and Fishbach 2014) and vivid depictions generate emotional response (Brosnan et al. 2006;

Schneider and Kauffeld 2011), the results which point to the SmartProtector^{CA} encounters as more motivating are not surprising. Nevertheless, it points to an interesting field so far underrepresented in persuasion discourse (Petty and Cacioppo 1986a) or in PT discourse (Fogg 2009; Oinas-Kukkonen 2013): the use of multimedia for persuasion. Given the above discussion, we claim that some vivid depictions may have contrary effects, and therefore see the need for guidance on what multimedia should be employed for persuasion or nudging.

While the results suggest that PT-informed design may impact the advisee's sense of motivation and ability, there seems to be more than that that makes the people actually engage in efforts to change their behavior or attitude. Fogg's model (2009) suggests that successful persuasion also needs a *trigger*, a spark that lets the persuadee consider the given time and space as the optimal one to involve in change. However, the answers collected from the advisees and advisors point in a different direction. The advisees did not find the message convincing enough, because they sensed a mismatch between tool's features and advisor's approach. Some advisors were not able to give conclusive statements about their services because they could not see how their behavior, combined with the usage of some of SmartProtector^{CA}'s features, formed a holistic approach. As psychological research postulates, it is natural for humans to look for consistency and coherence around them and consider the most coherent stories convincing and plausible, despite their probability or truth value (Kahneman 2011). Given the opinions collected in the interviews, it seems that the advisors' and SmartProtector^{CA}'s messages were not yet attuned to each other enough to prevent this kind of interference.

5 Third iteration: From advisee motivation and empowerment to persuasion as practice

5.1 Key issue: Compatibility with advisors' daily work routine

The first two stations of the transformation journey provide a complex picture regarding the advisors' behaviors and the possibility of changing them through specific digital affordances. Advisors easily appropriated features, which took the documentation overhead off their shoulders: they took pictures of security weaknesses and they edited them while adding drawings, thus explicating problems and solution-dimensions for particular security issues. The reactions of the advisees show that those behaviors felt coherent but made the encounter less oriented at the advisee. However, advisors had difficulties or objections when adopting some features for motivation and enablement of the advisees: they were not sure about how to discuss needs or fears or what priorities they should put forward and how. Nevertheless, they liked to include adequate videos and multimedia in the stories and arguments they were presenting. The advisees perceived a mismatch between the IT's content or action offering and some advisors' behaviors, thus reducing their overall assessment of the digitally-supported service. This clarified that some desired behaviors easily emerge, when functionalities and affordances are provided, while otherwise, the affordances get rejected or the intended behaviors get altered in an unpleasant, unnatural, or incoherent manner. To understand the tensions between the intended practices and the existing routines, we decided to analyze the video footage of the simulated advisory services from the experiment to analyze how the advisors create a coherent experience in conventional settings, and compare them with the digitally supported encounters.

The study focused on persuasive practices, i.e., conversational practices employed to convince the interlocutor to sustainably change his attitude or behavior without deception or coercion, and parts of this study were previously published elsewhere (Dolata et al. 2016). The study revealed that the advisors employ a range of conversational practices and devices to convince the advisee to follow the recommendation (or its parts), while they often do not want to admit that they engage in persuasion. The study identified a whole range of such practices: advisors tell fictional stories involving the advisee ("imagine, you want to go to bed and your wife is coming back from shopping") or stories which refer to the neighborhood or analogous situations ("we've had a series of burglary incidents in a community like yours") to provide arguments for specific solutions, they employ real artefacts (e.g., a real screwdriver) or interact with the hardware (doors, windows, locking mechanisms) to explicate the risk, or involve the advisee in a small talk to learn about advisees' experiences and thoughts regarding burglary in a defensive manner. Apart from unveiling the practices themselves, the data analyzed for that study points to an interesting dependency between SmartProtector^{CA}'s features and the advisor's behavior or opinions about the features. Where the advisors noticed themselves, that their previous behavior sticks out from a continuous, quasi-natural interaction with the advisee, they were likely to implement an alternative behavior. However, this was not the case, if they considered their previous behavior internally consistent and plausible. In particular, picture-centric collaboration and documentation replaced routines which the advisors considered ineffective or conversationally unpleasant (writing documentation, collaboration driven by the static, and generic material). However, the discussion of fears and needs contradicted other routines, which the advisors used to discuss the condition and attitude of the advisees. And, they liked presenting multimedia, but only if it fit their story – for instance, they tended to value the fear videos more than the hope videos, because they were often telling a story of how a burglar would use this or that security weakness to enter the house. Since in the experiment the advisors were told to try to use SmartProtector^{CA}'s features, they could experience its fit to their routines, and the video footage allowed for observation of breakdowns in communication (e.g., excusing their behavior: "we've got a new tool in here and it tells me to ask you…"). The study of persuasive practices made two things clear: the transformation of the service in the first iteration succeeded (i.e., the advisors appreciated the tools' impact on the service), because the emerging routines conformed to the advisors' desired service. Furthermore, the transformation in the second iteration partially failed, because the tool offered actions competing with the advisors' routines and did not offer additional value, while stealing their attention. Consequently, the third iteration was launched to establish coherence between advisors' routines and SmartProtector^{CA}'s affordances.

5.2 Solution approach: Routinizing persuasion

The insights from the second iteration make clear that using SmartProtector^{CA} has the potential to enhance the burglary prevention advisory service while motivating and empowering the advisees. The advisees' responses comply with the theories underlying SmartProtector^{CA}'s design: multimedia sparks emotions and motivate for action, as well as a well-structured service and documentation, with a step-by-step recipe for improving the security, enables them and enhances their self-efficacy. However, some advisors experienced the interaction with SmartProtector^{CA} during the encounter as cumbersome and artificial for two reasons: the contradiction between SmartProtector^{CA} and the existing routines, as well as the cognitive load to process this mismatch and create a consistent

experience for the advisee. Multiple theories of cognitive load explain this effect: acting intuitively and according to routines demands less cognitive resources than conscious thinking or reminding oneself of the appropriate course of action. The latter actions require a relatively slow and resource-intensive rational processing, whereas the earlier type of activity relies on fast and "lazy" processing (Kahneman 2011). Since humans act faster whenever they embrace a routine and, also, they consider such actions more natural and less demanding (Kahneman 2011), the practical popularity of SmartProtector^{CA} strongly relates to whether the advisors can establish routines involving SmartProtector or whether they continue considering it a "foreign matter". The technology appropriation literature makes clear that transformation of work through IT requires consideration of multiple social and personal cues (DeSanctis and Poole 1994), as well as structures provided by the context, material, or processes (Orlikowski 2008). The available practice theories stress various aspects of work practices, from their very local, situated character up to their organizational dimension (Nicolini 2012). We emphasize the routinized character of practices (Schegloff 1986) and adhere to the view that their emergence depends on the societal, organizational and political discourses, apart from the situational and contextual cues (Scollon 2001). This perspective stresses the fact that the service encounter have a strong conversational and discursive character, and happens within an institutional context (Drew and Heritage 1992a; Wooffitt 2005). Overall, the literature points to cognitive load and missing practice fit as reasons for advisors' concerns regarding SmartProtector^{CA}.

However, the straightforward interpretation that the design ignored advisors' practices does not hold. On the contrary, the practices of advisors were studied and considered during the development of SmartProtector^{CA}, as were suggestions from their side. Nevertheless, the mismatch remained. We identified the following reasons: First, because there is no formal training regarding the burglary prevention advisory service, but rather learning-on-the-job from the predecessor, and because advisors differ strongly regarding their previous career (some were patrol officers, others worked in investigation, yet others came from outside police structures, etc.), some routines and practices natural to one advisor may be exotic or artificial to somebody else. Second, using SmartProtector transforms practices and their material element; for instance, even if some advisors were offering priority list to their advisees, they didn't create a graph in a coordinate system to represent it – the graphical representation of priorities in SmartProtector affords whole conversation passages on the topic of prioritization. Whereas the activity itself may be easy and relatively natural, introducing it into the interaction between the advisor and the advisee may be a demanding task. Consequently, it became clear that advisors require intensive training before being able to conduct advisory services that they so desired – a training that would consider the structures of their work as well as the structures and affordances introduced in the tool. The training should focus on the practices and routines, as well as offer practicing and reflection episodes.

5.3 Artefact description

Whereas the IT artefact (i.e., SmartProtector^{CA}) did not receive any significant improvement during the fourth iteration, the design efforts were oriented at a training and onboarding concept for the advisors and their results complemented technological artefact to form an information system (i.e., SmartProtector^{CA+R}). Together with the key users, the authors developed a concept for a one-day workshop, a hands-on day, and a one-day refresher. The hands-on day took place around one week after the workshop,

and the refresher followed approximately one month later. The workshop and the hands-on day were considered an entry event for the roll-out of the system to the advisors for the daily use in their job, and the refresher should give the advisors the chance to discuss their first observations and get additional user instructions if necessary.

Generally, the training included workshop elements intertwined with experimenting and reflection phases. Importantly, the researchers involved in the project presented themselves, primarily, as scientific company to the project, but a key user (one of two Swiss police officers who already employed the tool in their daily work) acted as a trainer. The training should resemble expertise sharing between colleagues rather than a teaching situation. During the workshop, which took place at the seminar room of the police agency, the advisors were encouraged to explicate their way of dealing with various customers, and the trainer explained the way she uses SmartProtector in her job, and proposed ways of using it in the situation described by the other advisors. For instance, she proposed to omit the emotional videos in encounters with recently victimized advisees and use a verbal description of how the recent break-in (according to police documents) might have taken place to help the advisee handle the trauma. This part lasted around four hours and resulted in a list of doubtful situations that might occur during an advisory service, as well as the best-practice recommendations from the key user. Afterwards, the advisors had the opportunity to use the tablets in simulated advisory services, where one advisor acted as an advisee and the other advised her on security in the provided rooms – every advisor acted as the advisee and as the advisor at least once each. The advisor acting as an advisee was encouraged to engage in normal and possibly problematic behaviors. Each pair was assisted by the trainer or a researcher throughout their simulation play. The simulation allowed for playing through various situation and spontaneous reactions. Thereafter, a reflection phase provided an opportunity to identify more and less effective behaviors and reinforce the proposed best practices. On the hands-on day, the advisors took part in simulations with test advisees, similar to the simulations used in the experiments in earlier iterations. Each advisor had the opportunity to test-out various approaches for work with SmartProtector^{CA+R} with two different test advisees in the prefabricated houses and reflect upon their experiences in one-to-one discussions with the researchers. On the refresher day, the advisors got the opportunity to reflect on their first experiences with SmartProtector, collected when advising citizens in real advisory services. All advisors participating in the study were invited for a workshop, where each of them could share their best practices as well as make suggestions for improvements. The primary goal was to enable a platform for sharing advisors' experiences with their peers – the session was organized and moderated by a police representative; the researchers took the role of observers who want to "learn" from the advisors about their practices and workarounds. The refresher day rounded up the training process. Overall, the mixture between providing examples and best practices, hands-on experiences, and reflection, offered multiple opportunities to identify more and less promising routines involving SmartProtector^{CA+R}, as well as allowed for explication of rationale behind some behaviors, features, and practices.

5.4 Evaluation method

According to the applied maturity model (Nunamaker Jr et al. 2015), the *proof of use* phase should provide evidence of applicability of the proposed and previously tested solution in the day-to-day work. Additionally, it should confirm the value of the artefact or the intervention in the real environment. In our case, this embraces assessment of

SmartProtector^{CA+R} in the daily work, and understanding the impact of the transformed advisory service on the advisees. To investigate the practical impact of SmartProtector^{CA+R} on the advisory practice, a number of methods were applied: First, a researcher accompanied nine advisors during their daily work – the researcher attended to 24 advisory services, where he collected chronological notes, and then conducted an interview with each of the advisors to reflect on particular situations from the encounters. Second, the advisors and their managers participated in workshops with the researchers, which allowed for shared discussion of the collected observations and the opinions from the advisors. At the time of the workshop, all advisors participating in the study have conducted over 1400 advisory encounters using the tool – almost 80 per advisor. Third, each of the sixteen advisors participating in the study, as well as their managers, were interviewed. The advisors filled out a survey on how they perceive the advisory services with SmartProtector^{CA+R} using a range of self-developed items, and established scales (Briggs et al. 2012). Importantly, the items were formulated in a way that refer to advisors' skills or behaviors, and not to the future potential of SmartProtector.

5.5 Results

The survey distributed to the 16 advisors addressed their assessment of the advisory services they provided with SmartProtector^{CA+R} (IT) and without it (conv.). Tables 13, 14, and 15 present the items and the obtained results.

Scale OR *Item* (7-point Likert scale)	Average IT	Average conv.	Significance data (one-sided, paired t-test)
Satisfaction according to Yield Shift Theory (5 items (Briggs et al. 2012))	5.65	4.70	t=2.49, p=0.025
1. I could convince the residents of my recommendations.	5.97	5.19	t=2.82, p=0.013
2. I could put residents in a position to implement the advice.	5.88	4.88	t=2.58, p=0.021
3. I could motivate residents to implement the advice.	6.19	4.88	t=4.39, p=0.001
4. I could make the security flaws clear to residents.	6.19	4.75	t=3.94, p=0.001
5. I could make the difference between solution and problem clearer to advisees.	6.13	5.00	t=4.70, p=0.000
6. I could discuss the residents' needs and fears with them.	5.75	5.44	t=1.23, p=0.237
7. I could highlight the priorities for advice implementation.	6.44	4.69	t=5.22, p=0.000
8. I could explain the working methods of the burglars.	6.13	5.13	t=2.45, p=0.027
9. I could highlight the security flaws of the residents' property.	6.31	5.69	t=2.30, p=0.036
10. I could explain the potential solutions to the residents.	6.44	5.50	t=2.91, p=0.011
11. I could commit myself to the residents from the beginning of the encounter.	5.56	5.69	t=0.44, p=0.669
12. I could include the sceptic/doubtful resident in the service.	5.75	5.19	t=145, p=0.167

Table 13 Results on indirect comparison between the APS burglary prevention service encounters supported with SmartProtector and classic burglary prevention service encounters.

Item (7-point scale where -3 stands for *IT*, 3 for *conventional*, and 0 is neutral)	Average	Significance data (one-sided, paired t-test)
13. The service encounter was more convincing for residents.	-1.44	t=5.26, p=0.000
14. The service encounter was likely to motivate the residents to implement recommendations.	-1.06	t=4.58, p=0.000
15. The service encounter put residents in a position to implement the advice.	-1.13	t=4.39, p=0.001
16. The service encounter was more personalized for residents.	-0.94	t=2.53, p=0.023
17. The service encounter was more likely to generate the desired emotions.	-1.31	t=3.88, p=0.001

18. In the service encounter, the security flaws were easier for residents to comprehend.	-0.88	t=3.05, p=0.008
19. In the service encounter, the recommendations were easier to comprehend.	-1.19	t=3.13, p=0.007

Table 14 Results on direct comparison between APS burglary prevention encounters supported with Smart Protector and classic burglary prevention encounters.

Item **(7-point scale where 1 stands for *minimally useful* and 7 for *very useful*)**	**Average**
20. Adding individual photos of the building's exterior to the encounter's final report.	4.88
21. Adding individual photos of the security flaws to the final report.	6.00
22. Presenting videos regarding security flaws and problems.	5.56
24. Presenting videos regarding the recommendations and solutions.	5.50
25. Presenting sketches of the recommended solutions.	5.19
26. Creating a final individualized report to be sent via email to the resident.	6.25
27. Selection of individual needs and fears of the resident to be included in the report.	5.50
28. Setting up email contact with the residents as a feedback and question channel	5.69

Table 15 Results on the assessment of usefulness of specific functions and design elements implemented in SmartProtector.

The results in Tables 13 and 14 explicate the advisors' preferences for service encounters supported with SmartProtector^{CA+R}. This tendency was confirmed by advisors' responses to the NetPromoter question (Reichheld 2003). For the SmartProtector^{CA+R} service encounter, 12 out of 16 advisors chose an answer of nine or ten on a 10-point scale, thereby positioning themselves as promoters of the APS, while only one person chose five (i.e., a value below 6) – a detractor. Overall, after around six months of using SmartProtector^{CA+R} on a daily basis, the advisors clearly favor this tool compared to the conventional advisory service.

They confirm the role of match between their practices and use of the tool for the optimal experience on the residents' side when referring to particular, cumbersome situations (like the ones discussed in the training). For instance, they generally decided to or not to present a video of a successful burglary (including burglars' practices) based on their assessment of the advisee's sensitivity to the topic: *"This is a matter balance. (…) You must always look at who you're talking to. Is it a sensitive or an almost traumatized victim? Then you should omit the pictures and video because those people are damaged enough, and you have to be careful with your choice of words"*. However, with other features, such as prioritization, several basic tendencies emerged over time. A small minority of advisors prioritizes issues only in special cases: *"I normally push everything to instant and possibly high priority. I also tell people: »You know, I can tell you now that this window is more likely than another, but one burglar might come through the cellar, and another over the balcony« (…) But sometimes they have a specific need, like securing their collection of stamps, then I put this to the highest priority"*. Second, a large group of advisors prioritized issues based on their own assessments, experience, and data from police databases: *"We as consultants prioritize where we see the highest risk as »high and immediate« and the others as less urgent. And I wouldn't proceed and change that later (…)"*. Those advisors see prioritization as information transfer, nevertheless, their approach results in a documentation which provides a step-by-step recipe to the advisees. Third, some advisors treat the action plan primarily as a motivating element, and therefore try to consider the suggestions from the advisees' situation, including financial resources: *"It depends on how I feel people are willing to implement things and what their financial background is. You say something like this: 'if you think it's going to be tight, please start with the back windows, where a burglary is likely to start'. They need to continue*

securing their property bit by bit, depending on their resources" or *"If someone says 'I feel least secure about this garden side of the building' then I memorize it (…) this becomes security flaw number one and I will put it as a short-term and top item in the priority list"*. The last practice, i.e., the combination of advisee's and advisor's standpoints, was proposed as best-practice during training, such that its emergence does not surprise. What is interesting, is the care the advisors take of the consistent experience they offer to the advisee and their reference to particular sentences they might be likely to say or hear in an advisory service. This shows that specific routines (including conversational routines) have emerged, and the advisors can return to them if necessary.

5.6 Insights

First of all, the results make clear that, after long-term use, the advisors see the positive effect of SmartProtector^{CA+R} on their advisory encounters. They acknowledge the potential of this tool to motivate and empower the advisee, amongst others, by generation of the desired emotions and by provision of an individual action plan. This assessment from the advisors is in line with the opinions collected from the advisees in the previous iterations, and provides a final confirmation for the *value* that the tool produces. Simultaneously, the fact that many of the advisors used the tool in their daily work according to the initial action offering is the ultimate *proof of use* – not only do many advisors routinize some of the suggested behaviors, but also established communities of users (e.g., advisors from one department) who shared their observations and ideas on how to apply SmartProtector^{CA+R} (Nunamaker Jr et al. 2015). While the general tone of the opinions (qualitative and quantitative) is positive, some of the comments point to a set of problems related to the appropriation processes of the system.

The third iteration of the discovery journey makes clear that developing a system – be it for existing practices or to enable new ones – is not the last step in digital transformation. A transformation requires more than that: new practices need to emerge and become routines, existing practices need to adapt to the new material, and the practitioners need to accept the practices as their own. The appropriation of technology is not a straightforward process (DeSanctis and Poole 1994) – it depends on the structures of the practitioners' daily work (Orlikowski 2008) and requires an emergence of routinized behaviors in the work situation (Schegloff 1986). What strikes the most in the qualitative results is the relevance of the advisors' internal picture of the advisee and their private description of their work appointment for their appropriation decisions. This is in line with the view of practice as an element of the overall, societal discourse, where each handling implements particular viewpoint and a specific voice towards this discourse (Scollon 2001). The themes advisors addressed in the interviews were sometimes about particular characteristics of an advisory situation, but also about expectations from the management, society, politics, and about the "vision" of an advisee. This points to a particular weakness of the training concept applied: Whereas the training concept acknowledged the role of routines and practices, suggested best practices, offered ways of dealing with complicated situations, and argued for specific behaviors, it did not explicate the overlap between the motivation for new practices and the rationale behind advisors' practices beyond the situational context. Consequently, if the advisors did not accept the argumentation for a certain behavior, they acted in accordance with their primary rationale and developed their own practices, deviating from the suggested ones.

The context of the project was particularly challenging when it comes to the existing practices and addressing them in design. First, the diverse advisors' background resulted

in a whole range of attitudes towards the advisory encounters and the role of advisor therein. Second, the hierarchical structure of police agencies generates barriers between the advisors – they have much easier access to other colleagues from the same police department, such as patrol or investigation officers, than to other prevention advisors such that the dissemination of successful practices was at least difficult. Third, various advisors act upon various pictures of advisees, depending on their private experience and attitude towards the citizens, but also resulting from typical differences between various communities (e.g., some advisors are active exclusively in cities, others in typical university towns with lots of academics, while others are responsible for rural areas). Consequently, each advisor developed her own set of more or less successful practices, such as narratives, stories, and arguments. Those practices imply a picture of the advisee, as well as specific job description or background. Each advisor acts upon her own rationale, even though the general objective, "crime prevention", seems common for all of them. Designing for practices in such realm is as challenging as it is rewarding. The final station of the journey makes clear that transforming the encounters requires discovery of problems and solutions to address them but produces positive effects for both sides of the encounter.

6 Discussion

The current study illustrates a design research story driven by the need to improve burglary prevention. Burglary prevention as a category of crime prevention fulfills an important role in local communities around the world: communities free from burglary experience higher levels of trust and life quality, while regions with a lot of burglary cases desolate more and more (Bogaard and Wiegman 1991; Bernasco 2014). Given the very low detection rates in many developed and underdeveloped countries (Eurostat 2017; FBI 2017), effective prevention of burglary promises more success (Bogaard and Wiegman 1991). Apart from resocialization programs for criminals and potential criminals, public agencies offer services for potential and recent victims of burglary to prevent their (repeated) victimization. This study focuses on burglary prevention advisory service involving a police officer, who advises residents and owners of residential properties on how to improve the security of those properties by implementing technical anti-theft measures and safety behaviors. This kind of service has been criticized by practitioners for its low effectiveness: while many residents attend such services, only few would implement the advisor's recommendation at a sufficient level (Comes and Schwabe 2016b). Given the fact that similar problems occur in other services, e.g., in doctor-patient or unemployment support encounters (Svensson et al. 2000; Swindell et al. 2010; Duell and Vogler-Ludwig 2011), this issue has a general relevance (Yaniv and Kleinberger 2000). Different than the previous research, this study took an explorative approach to identify possible phenomena linked to the reduced effectiveness of burglary prevention advisory service, and complemented it with design efforts to offer a technology-based intervention. Thereby, it embraced the spirit of DSR by consequently employing the artefact design and evaluation, not only as an opportunity to generate a working solution, but also as a way to better describe the underlying problem – special attention was given to the "design as a search process" premise (Hevner et al. 2004; Hevner and Chatterjee 2010). The three iterations revealed that the burglary prevention encounters have problems ranging from ineffective or simply no documentation routines, over a seemingly chaotic course of action, the ineffective application of emotions and empowerment, to a mismatch between

the advisors' practices and the vision of a desired service. In response to those problems, the study describes the emergence of a socially-augmented persuasive system instantiated by the successively improved and specialized SmartProtector. The journey explicates how the system matured technically and conceptually over time: initial re-engineering from expert-layperson knowledge transfer into a collaborative problem-solving was extended by adding elements for empowering and motivating the advisee, and by embedding the proposed system into advisors' routines.

The collected opinions from the advisees, advisors, and management reveal that a sustainable and broad transformation by designing for practices is only possible if the design affordances are compatible with the rationale behind the existing practices. This sentence may sound obvious, but its actual meaning becomes clear if we consider three different interpretations of designing for practices as they occur in the existing literature (Wulf et al. 2011; Nicolini 2012). In the most common version, *designing for practices* implies designing for intended practices: DSR researchers invest time and effort in designing artefacts, which afford specific new practices and behaviors to support the users (Fischer et al. 2012; Gregor et al. 2013). Figure 22 (left) illustrates this situation in abstract terms. Designers act upon the assumption that they understand the overall, explicit goals of the situation, and subsequently propose new practices that support those goals through implementing action offerings in the technology. However, if the current practices get ignored altogether, the technology may be appropriated only in parts or not at all, such that the affordances have no effect. This explains the insights from the first and second iteration: through introducing a whole range of new, intended practices, the character of service changed radically from a personal conversation towards impersonal work encounters. While this change certainly had positive effects, it lacked the natural character and the interaction flow as noticed by the advisors and the advisees. One could expect that with time the new practices would disappear or would be conducted only partially in the encounter to keep the personal atmosphere in the encounter.

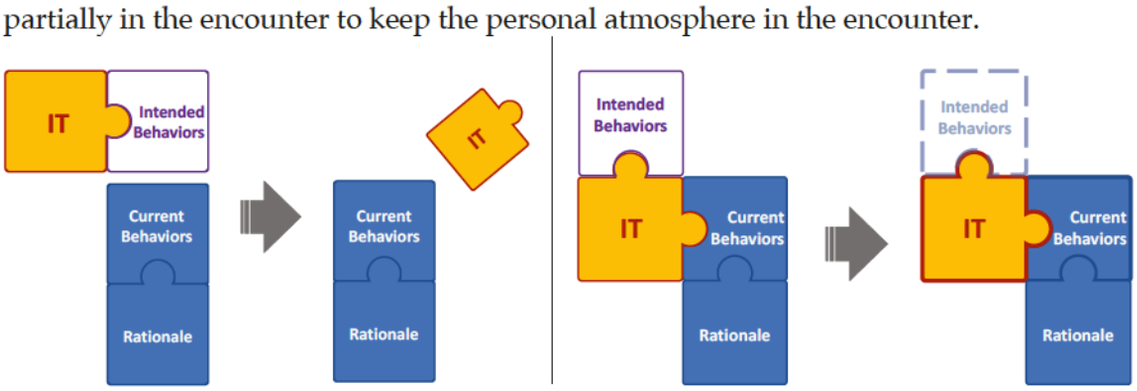

Figure 22 Left: Designing for the intended practices. Right: Designing for the current behaviors.

From the current perspective, we see that the third iteration was oriented at re-invigorating the personal elements of the encounter. The design and training took into consideration the existing practices and made an effort to represent them in the design. Figure 22 (right) illustrates this in abstract terms and reframes "designing for practices" as effort oriented at providing IT which fits the current practices of the users. In this situation, designers act upon the assumption that they understand what users do, and develop a system which affords new practices and tries to link them with the existing practices. However, if the linking of existing and intended practices is too loose, the intended practices may occur only fragmentarily. This is what we observed in the third

iteration: advisors responded positively to some affordances, while others turned out to be, at least, controversial and were accepted only by some advisors.

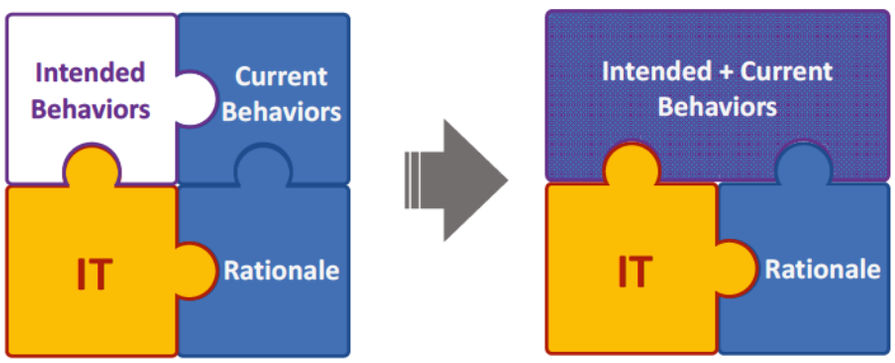

Figure 23 Designing for practices as designing for the intended behaviors and the rationale behind the existing practices.

We claim that the advisors who adopted the intended practices did so because the rationale behind those practices implemented in the system was compatible with the rationale that drove their own routines. Figure 23 illustrates this situation. Whenever the technology affordances are compatible with the rationales that drive user practices, it is more likely that the intended practices will be adopted as well. This view reformulates "designing for practices" as designing for the rationale behind specific practices, rather than designing for specific behaviors. In the above case, advisors who followed the general idea of motivating the advisee (be it because of their own internal belief or because they derived this task from their position in the police) were more likely to respond positively to affordances addressing advisees' motivation. Such advisors were likely to motivate the advisee when prioritizing security issues by considering advisees' interests and needs. Advisors whose practices were oriented at creating a picture of uninvolved and objective police officer acted in a different way. Consequently, we claim that design for new practices and the adequate appropriation of the technology requires the designers to learn about the motives that explain specific behaviors – not only the rational and overt goals, but also the more implicit considerations resulting from the user's own standpoint concerning relevant societal and organizational discourses.

Along this journey, the growing maturity of the system allowed us to identify yet more advanced issues and opportunities for improvement. While the early prototype confirmed the essential concept of changing the encounters with an IT-based intervention, thus providing a *proof of concept*, only through extension beyond the original scope (i.e., beyond enabling the co-creative problem solving), the *proof of value* and *proof of use* could be completed (Nunamaker Jr et al. 2015). The bottom line is that the study provides a consistent and continuous application of the last research mile framework for DSR (Nunamaker Jr et al. 2015) to a relevant real world problem, and shows how working on the categories proposed in this framework contributes to the rigor and to the practical impact. During the first iteration, i.e., in the *proof of concept* phase, the principal technical feasibility of a system sufficient to support central tasks within an advisory service was tested and confirmed – in particular, we confirmed that usage of the system touches upon relevant variables and changes advisees' perception of the service. This phase also produced the initial understanding of the problem (advisees who do not feel addressed during an advisory service), strengthened the initial theoretical model of what an advisory service is about (co-creation and joint problem solving, rather than knowledge transfer) and led to an extension of the theoretical basis by consideration of theories on

self-efficacy and persuasion, thus making clear that the advisory service needs to prepare the advisee for action taking and motivate them to do so. The second iteration, i.e., the *proof of value* phase, allowed for more exact measurements of the intervention's effects. In particular, they confirmed that the solution developed along the updated theoretical model produced the expected effect – the advisees could get motivated to adhere to the advisor's recommendation and felt able to do so. The third iteration, i.e., the *proof of use*, incorporated the practice-oriented view on appropriation and through practitioner-to-practitioner training and workshops set a seed for a community of practice. Through the appropriate training, and some non-functional technical improvements (e.g., stability), SmartProtector transformed from an experimental prototype to a work tool used on a daily basis by a growing group of advisors. The manifestations of the success are the positive reports from the advisors and the advisees, as well as the transfer of the knowledge into a commercial solution and the subsequent interest from advisors or police agencies who did not participate in the project. Overall, this article contributes an exemplary success story on how DSR can be applied to a real-world problem in a high-touch, collaborative context along the last research mile framework. The rarity of this article results from its global, comprehensive view, regarding the time dimension from the very beginning of the project until its transfer to a commercial solution and the conceptual granularity ranging from singular decisions on functionality (taking pictures), relation between functionalities (picture as a representation of a problem and graphics as a representation of a solution), up to the level of practices and processes overarching an advisory service.

Importantly, throughout the project, the main project aim (improving burglary prevention advisory services) remained constant, but the understanding of what it involves has evolved. The initial target was rather general: Burglary prevention has similar problems to other services we knew from previous research (financial advisory encounters, travel agencies, town hall services) and we assumed that employing an analogical solution would solve them. However, the rationale became increasingly concrete during our works: (1) through linking of problems and solutions, the actions to be taken would be more reasonable for the advisee (Clarke et al. 1996, 2006), (2) through providing an understandable, step-by-step recommendation, the advisee would obtain a belief in his capacity to implement it (Ozer and Bandura 1990; Bandura 1997) and in his ability to fight crime (Bogaard and Wiegman 1991), (3) through illustrating and bringing the burglary consequences to mind in videos and graphics, the advisee would become emotionally appealed to address burglary in his property and neighborhood (Hale 1996; Barberet and Fisher 2009), (4) through enhancing the coherence between the tool and the advisor routines, the advisee would obtain a coherent and convincing message. Consequently, the understanding of the encounter, and, in particular, the understanding of what characterizes an effective encounter, apart from its effect, changed. A persuasive encounter, i.e., one that actually persuades the advisee to implement the recommendation, is therefore not only generally collaborative and attractive, but also empowers and motivates the advisee, as well as provides a coherent and convincing overall experience. We expect that a socially-augmented persuasive system built along those lines will be applicable in other domains beyond burglary prevention – the early trial with workplace security in agencies with risk of offensive and aggressive clientele (immigration office, employment agency, etc.) provides promising results.

7 Conclusion

Through iterative exploration and design efforts, this study disassembles the notion of a persuasive service encounter in a non-commercial realm. It clarifies the *rationale* of such encounters: even though the advisors are not monetarily driven when conducting such encounters, the essential goal is, in many cases, bringing the advisee to implement the recommendation. Also, this study iteratively develops an intervention to enhance the quality of advisory encounters and evaluates it at various maturity levels. The researchers in the area of advisory services benefit from the new framing of an advisory service which embraces the co-creative problem solving, persuasion, and routinized behaviors – this view extends the hitherto dominating conceptualizations of advisory service as expert-layperson interaction or as a marketing instrument for customer retention. Additionally, the concept of socially-augmented persuasive system as a design principle for effective service encounters can be employed in a range of settings beyond burglary prevention. Furthermore, the researchers applying or theorizing in DSR in information systems benefit from a full description of a design project – whereas the theoretical contributions to DSR has flourished over the last years (Venable 2015), the community keeps calling for case studies and examples of DSR's application (Nunamaker Jr et al. 2015). This particular study shows that the exploratory efforts regarding the design problem and the design solution are necessary, not only in the early stages of the project, but throughout the duration of a DSR endeavor. Even if working with a mature prototype, slight adaptations of the proposed design can help capture the value of the artefact and reach the overall goals – this confirms that IS artefacts are highly complex and often generate equally complex phenomena, which require disassembling and exploration at various maturity stages. We also point the DSR researchers addressing collaborative high-touch situations (e.g., in HCI or CSCW) to the fact that the design efforts may address the artefact itself, but also the training processes, interaction practices, and even the roll-out process: a design effort does not end with the artefact being built and evaluated – this may be the beginning of an essential improvement. IS researchers benefit, furthermore, from links this study establishes to the domains of persuasive technology and crime prevention – both areas have been dynamically evolving in the last few years while yielding interesting research questions. In particular, crime prevention currently enters the phase of digitalization, which opens possibilities to a whole range of IS researchers and professionals: supporting internal processes in crime prevention agencies, employing data science for preventing crime, extending the impact of prevention measures through effective use of social media and modern technologies, etc. This study contributes to crime prevention research by clarifying what direct prevention encounters are available. Furthermore, it proposes the concept of socially-augmented persuasive system as a means of enhancing residents' preventive behaviors. We call for further research within the crime prevention domain to compare or combine the proposed solution with other measures, such as subsidies for security-oriented renovation or neighborhood security initiatives. Finally, we point practitioners and researchers in the mentioned areas to consider that a system, especially in a high-touch context, embraces not only an IT artefact or instructions on its usage, but embraces people who interact with each other and with the system. As the last iteration explicates, their individual goals and positions may vary, which requires high sensitivity, openness, and time. Designing for practitioners is a challenge, and a research mile worth going.

This study does not come without limitations. Importantly, parts of the contributions were published in conferences (Giesbrecht et al. 2015; Comes and Schwabe 2016a, b; Dolata et al. 2016). Nevertheless, each iteration presented above includes at least one third of new material in the results (previously unpublished quantitative and qualitative analyses) and in the insights (interpretation of those results against previously unconsidered literature and from the perspective of a research journey). Furthermore, this publication provides a full picture and has contributions of its own (e.g., regarding the DSR, framing of an advisory service, or the concept of a socially-augmented persuasive system). Clearly, the numerical power of the statistical analyses can be questioned (e.g., small n in the experiments) – the number of people involved in the experiments followed from our best intention to balance out the available resources (work time of the advisors, fees and allowances for the support personnel, accessibility of the prefabricated houses fair), the ambition to look deep into the field and collect extensive qualitative data for exploration, and the statistics. Those issues are typical for research with practitioners with its requirements to compromise between research and practical goals, to cope with limitations of research effort by financial and time issues, and to adjust to the changing constellations of project partners (as declared in chapter 2). Furthermore, this study leaves a range of questions open for further consideration: Does a socially-augmented persuasive system produce similar effects in other application areas, e.g., in medicine? What is the role of persuasion (as opposed to selling) in commercial service encounters, e.g., in financial institutions? What are the long-term effects of enhanced burglary prevention advisory services on individuals and communities? Those questions can be the beginning of another fascinating research journey with practitioners.

PAPER IX

High-touch, high-quality service interaction: Human-centered financial advisory services with tangible pen & paper interfaces

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Abstract
Advisory services rely on high-touch interaction between advisor and advisee to foster rapport-building and on high-quality service provision to guarantee for the desired outcomes. Modern IT promises to improve service encounters by automated documentation, simulations, visualizations, and better decision traceability. However, IT can also de-humanize advisory service encounters – advisors refuse such systems in their daily practice. Hence, a system for personal advisory services needs to support the high-touch character and complement it with the advantages of IT. This article builds upon the advancement in the areas of tangible user interfaces, pen-and-paper interfaces, and spatial augmented reality to offer a system for financial advisory services, LivePaper, which preserves the existing pen-and-paper advisory practices and extends them in the virtual space. The article contributes a range of design principles as well as instantiation of the system for mortgage advice services. The evaluation confirms that LivePaper generates value for advisees and advisors.

1 Introduction

Advisory service encounters rely on high-touch, face-to-face contact between two individuals, the advisor and the advisee, to allow for rapport, impression and trust building (Dolata and Schwabe 2017c). However, not only the interpersonal dimensions play a role – advisees' and regulators' expectations towards advisory services grow continuously: regulators request better documentation and traceability going beyond traditional contact reports (EU 2014), advisory service providers demand better integration of frontline contacts into their IT ecosystem as well as process consolidation (Schwabe and Nussbaumer 2009; Nueesch et al. 2016), and advisees expect transparent, all-inclusive and informative advice (Mogicato et al. 2009). An optimal advisory service combines, therefore, the high-touch atmosphere with high-quality service provision. Dedicated IT was shown to enhance quality beyond the traditional setting by improving transparency (Nussbaumer et al. 2012) or knowledge transfer (Heinrich et al. 2014b), but also to disturb the sensitive, interpersonal relation (Schwabe and Nussbaumer 2009; Heinrich et al. 2014a; Kilic et al. 2016) – IT dehumanized the encounter. Similarly, there is some evidence that IT may intensify joy during service encounter (Novak and Schmidt 2009), but it did not lead to an overall higher-quality service. The clue is to enhance the practical quality and the high-touch character at once. This holds, specifically, for areas where standard transactions move to the online channel anyway and the contact to a human representative, an advisor, becomes an exclusive event, e.g., in mortgage advice, retail banking, insurances, and tax computation. Overall, the domain of personal advisory services is under pressure, such that whole industry risk losing to online self-service. In the end, such a switch could also negatively impact the advisees, who lost the chance of discussing their individual situation with a skilled bank or insurance representative and limited themselves to self-services.

Part of the problem is the inadequate support for the advisors. Admittedly, information systems (IS) and computer-supported cooperative work (CSCW) research has approached various advisory services including financial service encounters (Heinrich et al. 2014a, b), burglary prevention encounters (Giesbrecht et al. 2015; Comes and Schwabe 2016b) and energy saving advice (Fischer et al. 2017) with prototypical systems. Whereas the prototypes improved information flow, documentation or transparency, they hardly ever approached the interpersonal matter equally effectively. Since the advisors, especially in finance domain, attribute success or failure of an advisory service to the interpersonal and emotional concerns (Schwabe and Nussbaumer 2009), the usage of those systems was low. Consequently, dedicated support systems for personal advisory services in banks, remain a niche product with little market presence despite the rising demand (Heyman and Artman 2015). The advisors stick to the pen and the paper for the collaboration with the advisee. Previous prototypes, especially those for financial advice, ignored the complex meaning of material and spatial practices between an advisor and an advisee (Dolata and Schwabe 2017c). However, tangible (Zuckerman and Gal-Oz 2013) and pen-and-paper (Steimle 2012) user interfaces offer ways to incorporate complex material practices into digital support for collaborative work. This paper describes a solution designed for humans and their embodied practices in advisory services, LivePaper, instantiated for mortgage advice service at a regional bank. The system offers support for the paper practices and affords new practices compatible with the rationale behind advisors' behavior. For instance, advisors manage the advisee's impression of the encounter by using their utensils, paper and pen, in a specific manner (Dolata and

Schwabe 2017c). LivePaper does not only allow for those practices while augmenting them with digital content but affords new material practices for impressing the advisee. LivePaper, on the one hand, enhances the service quality by augmenting traditional service with potentials of digital technology, like dynamic and crisp visualizations, and, on the other hand, provides new tools for strengthening the high-touch character of the service. Additionally, it reduces the media break between the online world and pen-and-paper reality of fact-to-face advisory services. This article reports on the design of LivePaper and on its evaluation in realistic mortgage advice service sessions at the bank. It adds to the discourse on supporting advisory encounters by instantiating a tool and deriving design principles. It also transfers and adapts insights from mixed-reality discourse to an important institutional setting, thus linking two, so far, distinct areas. Practitioners and researchers benefit from this step.

The current study follows the design research paradigm (Hevner et al. 2004): It relies on a description of a real world issue and observations from the field, enriched with the relevant literature, to develop an adequate solution in form of a collaborative IT. The system gets evaluated against the design objectives with use of acknowledged quantitative instruments and qualitative data. The design objective embraced using IT to simultaneously improve the quality and the high-touch character of financial advisory services. We design for practices (Wulf et al. 2011; Schmidt and Bannon 2013) by considering the identified and described practices occurring in financial advisory services and address the advisors' rationale behind those practices (Dolata and Schwabe 2017c). We employ acknowledged and popular instruments to measure the changes concerning the advisory service quality and collect further opinions from the advisees and advisors. Overall, our study confirms that a system oriented towards the material practices and towards the rationale behind those practices, such as impression management, effectively supports the advisor at providing high-quality services and improving the high-touch character.

2 Related Work

2.1 Advisory Services and Advisory Practices

Advisory services are institutional encounters between an advisee and an advisor. There exist several perspectives on advisory services and each view stresses a specific part as the very central element. Early on, advisory services were considered a type of service transactions (Jungermann 1999; Oehler and Kohlert 2009), while more recent developments frame advisory services as collaborative problem solving inspired by the value co-creation ideas from marketing science (Prahalad and Ramaswamy 2004a, b; Schmidt-Rauch 2013; Dolata and Schwabe 2017a). Yet later research points to the highly routinized nature of interaction in advisory encounters and therefore aligns with the institutional talk research (Drew and Heritage 1992b; Heath and Luff 2011). The relevant studies published in CSCW and identify typical practices that characterize the interaction between the advisor and the advisee. They determine persuasion (Dolata et al. 2016; Dolata and Schwabe 2017b) and impression management (Dolata and Schwabe 2017c) as elements of advisory services thus extending the other perspectives. Accordingly, the advisor and the advisee engage in a range of conversational behaviors that are formed by social graces and manners rather than abstract goals or processes. For instance, to persuade the advisee, an advisor would rather engage in a narrative with subtle, persuasive message rather than explicitly listing the arguments for or against a solution

(Dolata et al. 2016). Similarly, to manage advisee's impression of the institution or the advisor herself[10], she tends to use specific pen or paper, place the sheets of paper in an orderly manner, or take care of how her folder looks like rather than intrusively advertising herself or her bank (Dolata and Schwabe 2017c). The extension beyond sole problem-solving and transaction perspective points to new design and research challenges: IT for advisory services should not focus on transactions or problem solving only but requires additional focus on interpersonal behaviors, their material conduct and their rationale. This calls for intensified design efforts to offer adequate and acceptable support tools.

Nevertheless, designing for personal advisory services remains a challenge in itself. Reports on negative or double-edged effects of digital support on the interpersonal nature of advice-giving (Schwabe and Nussbaumer 2009; Kilic et al. 2016, 2017; Dolata and Schwabe 2017b, a) dominate over those which show a positive impact on the interaction between the advisee and the advisor (Comes and Schwabe 2016b). This holds specifically for the financial service encounters. Financial advisors emphasize the role of direct interaction with the client that is free of any disturbance (Schwabe and Nussbaumer 2009), care for explicit rapport building (Heinrich et al. 2014a) and the right impression (Dolata and Schwabe 2017c). Hence, advisory encounters at banks have remained largely free of any IT or involve improvised use of systems designed rather for individual use by the advisor (calculation tables in Excel, view of client's account, etc.) (Arvola 2004). Dedicated support systems for personal financial advisory services remain a niche product (Heyman and Artman 2015), despite their potential for streamlining the advisory service process (Nueesch et al. 2016), enhancing the knowledge transfer (Heinrich et al. 2014b), and the information and process transparency (Nussbaumer et al. 2012). The fear of service encounter dehumanization seems to dominate (Mogicato et al. 2009; Schwabe and Nussbaumer 2009). It remains unclear how to design a system that improves the quality of a financial advisory encounter as seen by the advisors and advisees and not only its singular dimensions. Only such a system has a chance to get appropriated in advisory encounters and counter the tendency towards robo- and self-advice, while emphasizing the unique feature of personal advisory services. This study claims that putting the humans in the center by supporting and advancing their practices is the adequate approach to meet the problems and challenges in today's service landscape.

The study of financial advisory services identifies various behaviors involving material (pen and paper) as an essential element of communication in financial advisory encounters (Dolata and Schwabe 2017c). Bank advisors were shown to employ paper not only as a medium for storing and presenting information, but also as a medium for the projection of their values and qualities or, rather, the values and qualities that they want the advisee to notice (order, competence, openness, etc.) (Dolata and Schwabe 2017c). Short, behaviors involving paper, even though superficially oriented at information transfer, have an implicit role of leaving a specific impression on the advisee. Whereas sales and marketing literature knows about targeted use of drawings for sale purposes ("pencil selling" (Thiele 1999)), the paper practices observed in financial service encounters affect also the positioning of the paper, presentation of the paper, and specific preparation routines (Dolata and Schwabe 2017c). This points to the very essence of advisory practices as an advisor's routinized behaviors that have explicit and implicit

[10] In order to guarantee for the gender balance, while keeping the manuscript easy to read, the advisor is referred to as a female (she, her) and the advisee is referred to as a male (he, his, him),

rationales, which express the advisor's standing concerning social, organizational, and political discourses, as well as her institutional identity. This definition sources at Schegloff's (1986) view of conversation as highly routinized achievement between two interlocutors and Scollon's (2001) argument that practices are not only situated in the intermediate context of an action, but also in a broader, social context – people's action embrace their general social, organization and political standing as well. Furthermore, we acknowledge the institutional nature of advisory encounters where the interlocutors act upon their specific institutional identity and mandate, according to known scripts and roles (Drew and Heritage 1992a; Svennevig 2001), which do not only affect what is being said or how, but also how physical communication supports the communication (Heath and Luff 2011; Svinhufvud and Vehviläinen 2013). Given the central role of physical elements, such as paper, in advisory services, the central question concerns how to design a system that supports advisory practices as a whole, i.e., their physical and conceptual side.

2.2 Interfaces between the Physical and Digital World in Advisory Services

Computer science, especially human-computer interaction (HCI), has studied ways of enabling natural interaction with computers. This research promises to combine material nature of human behavior with powers of a computer. The relevant efforts flow into a range of mixed-reality discourses: Augmented reality (AR) studies how to overlay physical spaces with computer-generated content (Azuma 1997; Billinghurst et al. 2015); spatial AR projects directly into the environment of the user (Bimber and Raskar 2005), however it requires powerful and high-fidelity overhead projectors and affordable 4K beamers arrived on the market only three years ago. Organic user interfaces (OUI) focus on using non-planar spaces that function as means of input and output, such that user can interact with them through bending, folding, and manipulating the form –this includes using paper as display (Holman et al. 2005; Holman and Vertegaal 2008). Tangible user interfaces (TUI) focus on enabling interaction, manipulation, and collaboration (Schneider et al. 2015) with digital content through physical objects and space (Ishii 2008; Zuckerman and Gal-Oz 2013). Finally, pen-and-paper user interfaces (PPUI) try to bridge the gap between digital interaction and the paper, remaining an essential tool in many human activities (Steimle 2009, 2012; Luff et al. 2009). All those areas of research share the interest in extending the physical world with digital content and functionalities. To a certain extent, they want to turn the user's focus and attention away from the computer and back to the physical world, thus allowing for calm design (Weiser and Brown 1996), i.e., one in which the technology provides information or enhances the experience, but does not compete for user's attention and stays in the periphery until needed. Each discourse offers numerous ideas on how a support system for human-centered financial advisory encounters could look like. However, it remains unclear which suggestions are promising and how to design and develop a combination of them to support the advisory services.

The scientific discourses listed above focus, primarily, on single-user interaction and therefore approach the ease of use from this perspective. However, financial advisory services pose additional problems. Since it is a collaborative situation, the activities of one party need to be accountable to the other party, such that the action can be properly interpreted within the context, place, and the applied script or role (Dourish 2001). Inability to interpret an action will lead to irritating misinterpretations which require attention to get resolved (Kilic et al. 2017); for instance, if an advisor needed to tap three

times on his face to launch a specific computation (even if this interaction is easy), the advisee may focus on resolving the meaning of the interaction rather than focusing on the content (Dourish and Bellotti 1992; Dourish 2001). The accountability rule supports also the advisee at understanding the content itself: with natural and visible data manipulation techniques, the advisee is more likely to understand the impact of specific actions on the financial situation or its representation (Heinrich et al. 2014b) – introducing manipulation of figures with clear meaning along with TUI's principles seems therefore helpful (Withgott 2015). Furthermore, since the financial advisors are concerned with the impression they make, any inappropriate or unprofessional action implemented in the system might result in reluctance to use it. This holds also for environmental features: advisory services take place in light rooms at designer tables, such that designing a system for a dark room (as suggested by many spatial AR applications (Azuma 1997; Bimber and Raskar 2005)) would break with advisees' and advisors' expectations regarding advisory encounters. Additionally, the high-touch nature of advisory services leads to actions and behaviors with fuzzy, implicit meaning – often the advisor makes notes that the advisee should not notice (Dolata et al. 2016). PPUI research encounters the same problem: many explicit activities (e.g., inking or drawing a link) have a varying conceptual meaning depending on the context, previous and future activities (Steimle 2009). Overall, even though the existing literature on mixed reality does not consider professional, institutional collaboration, it includes indications for promising interaction mechanisms. It remains uncertain how to combine those singular implications into a coherent system for financial advisory services and how such a system will impact the encounters. Furthermore, the mixed reality interfaces bring along new challenges: a system developed along those lines does not have clear boundaries; form and application of such a system is not a part of a typical advisory encounter script. Therefore, it is central to explore advisees' and advisors' reactions.

3 Design and Evaluation

3.1 LivePaper

Design Principles	Inspiration Mixed Reality	Inspiration Advisory Services
P1 (Impress): Support conventional paper handling to allow for routinized impression management practices.	Paper windows (Holman et al. 2005) Spatial AR (Bimber and Raskar 2005)	Paper practices for impressing advisees (Dolata and Schwabe 2017c)
P2 (Write): Support pen input to prevent disturbing effects of typing on the flow of monologues and dialogues.	Pen-and-paper user interfaces (Steimle 2009, 2012)	Disturbing advisory flow when typing (Kilic et al. 2016)
P3 (Visualize): Introduce dynamic visualizations on paper and tangible representations (chips) to support transparency.	Linking analogue and digital content (Luff et al. 2007, 2009)	Transparent advice via casual visualization (Nussbaumer et al. 2012)
P4 (Incite): Introduce tokens with emotional value to include joyful topics in conversation and in impression management.	Tangibles for fun (Xie et al. 2008) and joint focus (Schneider et al. 2015)	Increasing joy by emotional content (Novak and Schmidt 2009)
P5 (Shape): Introduce dynamic, tangible value manipulation, to spark immediate understanding of cause and effect.	Tangibles for learning and insight (Marshall 2007; Schneider et al. 2015)	Learning in advice by value manipulation (Heinrich et al. 2014b)

Table 16 Design principles for high-touch, high-quality advisory services instantiated by the LivePaper

The overall methodology applied throughout the project was Design Science Research (DSR) (Hevner et al. 2004). The problem identification phase relied on an extensive

ethnographical work published elsewhere (Dolata and Schwabe 2017c) and on previous research of the authors concerning advisory services and, particularly, financial advisory encounters (Heinrich et al. 2014a; Dolata and Schwabe 2016, 2017a; Kilic et al. 2016, 2017). Overall, the identified problem can be summarized as follows: The conventional financial advisory services are sub-efficient and require extensive pre- and post-processing to produce valuable documentation as required by the bank and by the regulators and require extensive calculations during the service provision if the advisee deviates from the scenario prepared by the advisor; their effectiveness relies strongly on the relationship and quality of conversation between the advisor and the advisee, which may decrease if the advisor has to make lots of calculations during the encounter or cannot rely on the prepared material. The IT-supported financial advisory services are sub-effective because the computer disturbs the rapport building and natural conversation. Consequently, the design objective was to connect the high-touch, human character of a conventional mortgage advisory service encounter with the functionalities of a computer (e.g., quick on-the-go calculations, dynamic visualizations, and seamless documentation). Since the high-touch, human character demonstrates primarily in material and conversational advisory practices, as explained above, the envisioned system shall support existing behaviors and afford new practices compatible with the overall rationale.

Existing advisory practices involve extensive and diverse use of paper and printed materials positioned on a table between the advisor and the advisee (Dolata and Schwabe 2017c). The novel LivePaper system does not intend to change the basic interaction principle, instead it enlivens the paper: the medium which has been used for interaction between the advisor and the advisee (through writing and gestures) gets augmented in a way that complements existing tools with computer-generated visualizations. The place of interaction consists of a table, two chairs at opposite sides of the table, as well as pieces of paper. Some are white sheets of paper marked with unobtrusive black marks, others are usual paper sheets in a paper pad with a pen. LivePaper supports behaviors involved in use and manipulation of paper sheets in a way that allows for input and output to and from the digital backend. To allow for output of digital content to paper, the system uses a projection with the Optoma UHD60 4K projector positioned above a table. There are two ways of input: (1) position, size, movement and rotation of the paper or the paper pad, as well as position of the participants hands are identified through Microsoft Kinect sensor mounted next to the projector; (2) handwriting and drawings on the paper are captured by the Wacom Bamboo Slate and then processed with handwriting recognition module from Microsoft to identifiy text. Inputs from the infra-red camera are interpreted by the system to identify the actions of the users (changing position, choosing a projected item by clicking). Recognized text input get digitalized – as soon as the system recognizes a specific code word, the subsequent content gets stored as a value of a predefined variable (e.g., net assets). The current list of code words mirrors the advisors' shortcuts used during conventional advisory services (e.g., "EM" for Eigenmittel, German for net assets). Other inputs from the pad are stored as unformatted text and are not processed by the system anymore but could be used by the advisor to complement the documentation; of course, they also stay on the paper in form of ink. Using this infrastructure, the advisor can engage in all behaviors typical for conventional advisory services: she can put several sheets of paper next to each other to compare their content, she can put the sheets of paper on a pile to return to them later, she can take notes and draw like she is used to do, she can positions, re-position and turn sheets of paper. However, those behaviors can be digitally enhanced: thanks to the marked paper and

projection, the sheets of paper, apart from inking or drawing, can be used for projection of digital content (dynamic visualization of loan-to-value ratio, affordability, and composition of a loan), she would otherwise tediously draw and calculate. Like in a conventional session, the content is linked to a particular piece of paper; the system remembers which content was projected on which sheet of paper, such that the paper can be moved out of the table, put on a pile, or turned upside down but as soon as the system recognizes it, the content returns too. The possibility to withdraw a sheet of paper from the table give the advisor the possibility to clean up the space and conduct the encounter in an orderly manner. Overall, LivePaper supports advisors' behaviors observed earlier (Dolata and Schwabe 2017c) and adds features that bridge the physical practice and digital representations by adding digital overlay or by analyzing analogue input (writing, moving, turning, pointing to select).

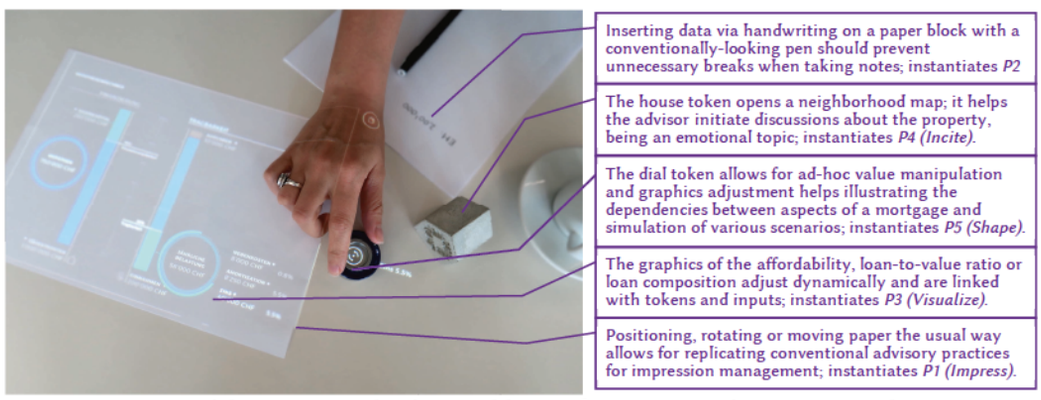

Figure 24 Instantiation of design principles from Table 1 in the LivePaper for mortgage advisory services

However, LivePaper goes beyond the known practices and offers additional ways for interacting with the system, which were not possible in the conventional setting. Those new functionalities enter the interaction as "tokens" – small, 3D control units, adapted to fit the particular application: mortgage advice services. A house can be positioned on the table to open a projection of the map showing the location of the property, the advisee is going to buy with the mortgage. Adding a chip to a mortgage changes the composition of the loan, such that the advisor can combine fixed-rate and flexible-rate mortgage by adding and removing chips, thus visualizing this procedure to the advisee. Finally, relevant numbers can be easily adjusted with a dial for simulation purposes, for instance, if the advisee wants to check an alternative scenario, which involves reduced net assets, monthly income, or growing interest rates – the output variables such as the affordability, loan-to-value ratio, etc. adapt automatically. Consequently, the LivePaper affords additional, new practices coherent with the rationale behind advisors' existing material practices. In particular, the house offers the advisor a possibility to present herself as a person interested in the property, who knows the neighborhood and cares for the advisee's quality of living by discussion of local circumstances (distance to the bus stop, distance to the next city, location of shops, churches, schools, etc.). The chips and the dial token, on the other hand, help with establishing an impression of a transparent, open and informative atmosphere: the advisee should feel free to ask for any scenario or mortgage composition and he can observe how the requested changes impact the whole situation. The chips and the dial token interact with content projected onto the sheets of paper, while house creates a projection directly on the table. Even though tangibles were not an element of conventional advice, their usage shall mirror material practices known from

there or, at least, be as natural as possible: for instance, putting a house on the table should resemble putting a brochure on the table; using dial should resemble setting a volume on a HI-FI. Additionally, the interaction with the tangibles makes advisor's actions visible and accountable for the advisee. Furthermore, an encounter should be also possible without using the tangibles at all (of course, without the functionalities they embody). Overall, the extension beyond the pen-and-paper interface comes in form of tangible control units that allow for more sophisticated interaction with the augmented, projected content. Altogether, the system was designed to implement a selection of design principles inspired by mixed realities and previous research on supporting advisory services. Table 16 and Figure 24 summarize the central design principles.

Overall, LivePaper combines several mixed-reality paradigms. The system augments real spaces and objects (table, sheets of paper) with digital content like in spatial AR (Azuma 1997; Bimber and Raskar 2005; Billinghurst et al. 2015). The augmented visualization is extended through interactive elements: the user can use their fingers for 'touch' input (e.g., selecting values to be manipulated), also on the paper that can be bended and re-positioned (cf. OUI (Holman et al. 2005; Holman and Vertegaal 2008)). All sheets of paper can be used for inking and writing on a paper positioned on the pad gets even recognized and digitalized; both participants can place any other piece of paper on the table without causing unintended interaction with the system. This enables for usual application of paper and pen during the advisory service, as well as interaction with the system via paper when intended, (cf. PPUI (Steimle 2009, 2012; Luff et al. 2009)). Tangibles extend the interaction possibilities beyond the pen and paper and enable for novel interactions in advisory services: rotating a dial changes selected mortgage values, tranches of a mortgage are represented as chips and a small house represents the property (those interactions follow the lines of TUI (Ishii 2008; Zuckerman and Gal-Oz 2013; Schneider et al. 2015)). In LivePaper, a sheet of paper can simultaneously be a projection space, a touch interface and a space for ink input, while staying a tangible and spatial resource, such that it can be freely repositioned, as well as moved out from the active interaction zone on the table. This allows for bridging between the digital and analogue world via paper (Luff et al. 2007, 2009).

3.2 Evaluation Design

The LivePaper was instantiated with all features presented above to support mortgage advice services at a regional, Swiss bank with 13 branches and approx. 400 employees, who serve an area inhabited by approx. 600'000 people. In the remainder of this paper, we refer to this bank as MoBa (*mortgage bank*). Two members of MoBa's management body joined the project steering committee consisting of four senior researchers from two Swiss universities. Additionally, MoBa's advisors provided regular feedback during workshops and formative tests concerning the system usability and the formal, content or calculation issues. The evaluation, providing results for the current study, tested the first functional version of LivePaper. This evaluation was conducted in a MoBa branch in January and February 2017 and was arranged as a within-subject design experiment (Mettler et al. 2014). Each subject passed through a conventional and a LivePaper-supported advisory service. They experienced the system in the intended use scenario, i.e., during a mortgage advisory service between a potential client and a professional bank advisor, and could compare it to the conventional situation. This enabled for understanding the positive and negative impacts of LivePaper on the advisory service. Six selected advisors, others than those who participated in the development process, were chosen for this evaluation. They

received half-day training on the usage of LivePaper – during the training they learned about the system functionalities and simulated an advisory service with a colleague. Few days later, during the evaluation, each advisor advised three different test advisees while providing one conventional and one LivePaper advisory service to each of them. To balance out the order effects, we varied the treatments arrangement. The 18 test persons acting as advisees were acquired through official advertisement website of the university, available to the broader public and linked with social media. They were offered a compensation of 60 CHF (approx. 60 USD) for 2.5-hours experiment. On average, the subjects acting as advisees were 27.5 years old, with the youngest participant aged 20 and the oldest one - 49. Their professions included, among others, shop assistant, nursery teacher, designer, or veterinarian assistant; 7 participants were students from various fields and universities. All declared to have interest in the topic, because they consider buying a property or have experience on mortgages. They were provided a rough handout including information on their test financial situation, on the property they pretend to buy, and a few questions often asked by advisees in real sessions. However, the advisees and the advisors were free to proceed the way they want during the encounter – some conversations deviated from the handout depending on the content. This shows the highest care given to the natural, realistic character of the services.

The design experiment enabled for the collection of advisees' and advisors' assessment regarding impact of LivePaper-supported advisory services in comparison to the conventional ones. In particular, the advisees and the advisors filled out a questionnaire after each advisory service and participated in the interviews after all advisory services. To evaluate the research objectives, we employed a range of measures. To address the service quality, we asked the advisees to assess (1) the information transparency (Nussbaumer et al. 2012), (2) the bank service quality (BSQ, (Abdullah et al. 2011)), (3) the pragmatic quality (according to the Attrakdiff instrument (Hassenzahl et al. 2003)) and (4) the general satisfaction (according to the yield shift theory, YST, (Briggs et al. 2012)). The human, high-touch character of the encounter was covered by advisees' judgement concerning (1) the interaction with the advisor (according to the interaction rating questionnaire, IRQ, (Niederhoffer and Pennebaker 2002)), (2) the listening abilities of the advisor (according to multiple scales from salesperson's listening scale, SL, (Ramsey and Sohi 1997)) and (3) the general attractiveness, hedonic quality-identity, and hedonic quality-stimulation (all from the Attrakdiff (Hassenzahl et al. 2003)). IRQ and SL help assessing the rapport building processes between the interlocutr, while attractiveness and hedonic qualities have been previously used to measure advisee's emotional response to the situation. The advisors were asked to rate the service quality based on their (1) satisfaction (YST (Briggs et al. 2012)) and (2) the pragmatic quality (Attrakdiff (Hassenzahl et al. 2003)). To measure their view of the human, high-touch character, they assessed the (1) attractiveness, hedonic quality-identity, and hedonic quality-stimulation (Attrakdiff (Hassenzahl et al. 2003)), as well as (2) the IRQ. For each advisor we had 36 measurements for each construct – 18 regarding conventional advisory sessions and 18 regarding LivePaper treatments. The instruments were chosen based on their fit with the topic (BSQ, SL) as well as previous use in the domain (Attrakdiff, YST, IRQ, cf. (Novak and Schmidt 2009; Chen et al. 2014; Heinrich et al. 2014a; Kilic et al. 2015)). Because the innovative about LivePaper is its embedment in the practices and the interpersonal, human character, we decided to focus on measuring the high-touch character rather than other possibly relevant characteristics (the quality of documentation, rule compliance, or learning experience). In addition to the questionnaire-based

measurements after each mortgage advice, they were asked for their preference and participated in an interview. The interviews with the advisees took approx. 30 minutes and the ones with advisors approx. 60 minutes. Overall, the design experiment evaluated the LivePaper in a realistic scenario while collecting multiple measures on the advisees' and advisors' assessment.

4 Results

4.1 Feedback from Advisees

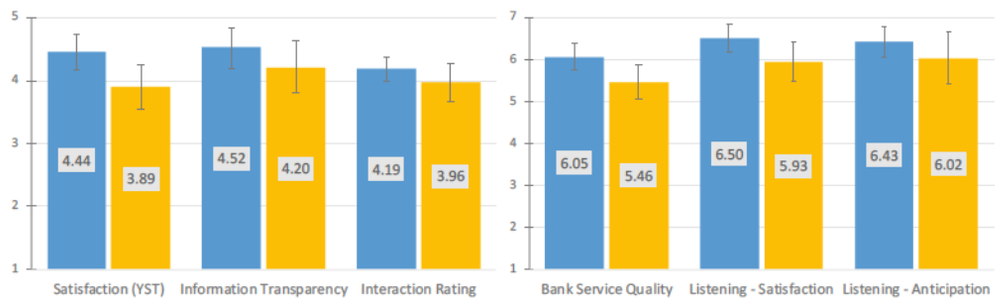

Figure 25 Average advisees' assessment of the advisory settings for the selected measurement instruments (blue – LivePaper, yellow – conventional, error bars: 95% CI). Max and min values are given on the y-axis.

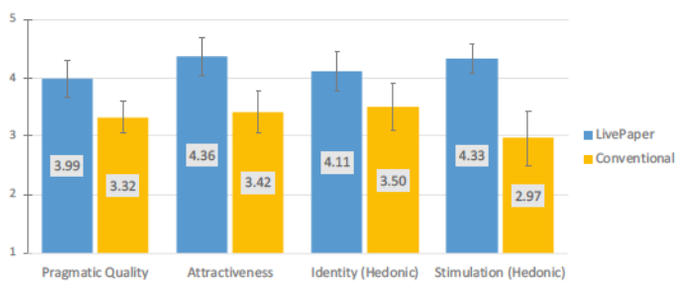

Figure 26 Average advisees' assessment of the advisory settings for the sub-scales of Attrakdiff (Hassenzahl et al. 2003) (blue – LivePaper, yellow – conventional, error bars: 95% CI). Max and min values are given on the y-axis.

Advisees' feedback shows LivePaper-supported services as significantly better than conventional ones concerning various dimensions. The general satisfaction and bank service quality (Figure 25) show the enhancement in the general quality. Improved information transparency (Figure 25), as well as pragmatic quality (Figure 26) confirm this tendency. IRQ and SL (Figure 25) illustrate improvement regarding the interaction between the advisee and the advisor, even though not all SL scales show a significant difference: while Satisfaction and Anticipation are significantly better in LivePaper setting, other dimensions of SL (Sensing, Evaluating, Responding and Trust) remain stable between conditions - this is consistent, as most relevant advisor behaviors do not change between the settings. In addition, strongly enhanced hedonic qualities and attractiveness (Figure 26) show the impact of LivePaper on the experience on the advisee's side relevant.

In the interviews, the advisees relate their assessment to a number of specific topics. A central and returning theme is the comprehensive character of LivePaper advisory services. The collected opinions attribute the better understanding to the illustrations provided with the LivePaper, but also to the fact that they can be dynamically adjusted, for instance, with the dial (called screw in by some advisees). The gestures involved in adjusting the values support the comprehensive character and encourage the clients to ask questions: "[I liked] both, the presentation, but also the dynamics, because he was

able to turn the screw directly, and then the graphics have adapted accordingly. That's just better to be understood than as if someone, let's say, makes arrows on the sheet of paper (…) It is easier to understand. (...) One just had a better overview and could track the connections between things, how they affect each other. I also had the heart to ask how it would change with 80% of income, because he would not have to enter everything again." Advisees preferred also the closure phase of the service, when the advisor summarizes the encounter, to be conducted with LivePaper: "It's easier. You just see a little structure, so on the side, you see now the data about my person, and about the house that I want to buy, and about my person and income, and then the portability is calculated (…) then the compilation of everything". They acknowledged the fact, that the clear structure supports understanding throughout the encounter, but did not have the feeling that they are forced to follow this structure: "[Interviewer: How about structuring the encounter?] [Interviewee:] Yes, that was more the case with LivePaper because he had those points. First with the mortgages and then with the mortgage mix. (…) With the paper, so in the normal consultation, it was not clear to me at which point we are. I did not know: Is this mix coming or not? And then, as he continued, I thought, Okay - probably not. But with LivePaper, I've seen that something is coming. I found that better with live papers. [Interviewer: Did you have the feeling that you have to follow a structure?] [Interviewee:] It did not seem to me directly predetermined." Apart from LivePaper's potential for making the interaction clearer and more welcoming, advisees acknowledge that introducing side topics through design, e.g., location of the property, eased the atmosphere and made the interaction more enjoyable: "In the first, conventional conversation the property was just there. In the second conversation it was nice to see: 'Ah the real estate is there.', I had already seen it. (…) He said: 'Look, Mr. Weber, here is your object, that is your neighborhood' – he showed interest and we could discuss it". Many advisees confirm that discussing the property made them feel, that the actual, human reason for having the encounter moves into the focus. However, some advisees miss a better link to the overall goal of the encounter: "I thought it was nice as a start. Well, I liked that he was interested in where it is. It would be a good start. But, if it had a connection to the rest of the conversation, it might be better." Advisees also acknowledged the fact, that LivePaper turns back the advisor's attention to the advisee and the communication: "When he was using the calculator and his sheets, and was about to work something out, I knew, I probably could not talk to him at that moment. When he was using the LivePaper, he had the same basis as me. He did not have to concentrate on the inputs, but he knew that he can adjust the numbers and the system calculates for him. It gives him the opportunity to explain what is happening (…) and talk to me". Given the positive reception of LivePaper, we tried to make the advisees reflect on whether a tool like this may be used to fool a potential customer. Most advisees argued against this risk: "I think as a customer, I'm already aware that the consultant wants to hear my interests, but primarily he actually stands for the bank (…) Well, the customer has a great deal of responsibility for what he wants and how he wants it. (…) With LivePaper, I think you could adjust everything and you could simulate different scenarios and it was better there, clearer. And you have the numbers all in front of you and so you felt more confident, because you had everything in front of you, with simulations and you could compare. And in the conventional case, it was, maybe, a maximum of 20 words or just with the numbers there. And yes, that was just too little to somehow create the same confidence as in the LivePaper." Overall, the advisees see advantages of LivePaper for better understanding and transparency, clearer but non-enforced structuring of the encounter,

joyful or engaging elements, and better contact with the advisor. They attribute those advantages to visualizations and tangibles, but also to the way those elements get embedded in the practice.

	Measurement	*LivePaper Mean*	*Conventional Mean*	*t(17)*	*p (two-tailed, paired)*
Service Quality	Satisfaction (YST)	**4.44**	**3.89**	3.01	0.008
	Information Transparency	4.52	4.20	2.52	0.022
	Bank Service Quality (BSQ)	**6.05**	**5.46**	5.03	0.000
	Pragmatic Quality	**3.99**	**3.32**	3.69	0.002
High-Touch Aspects	Interaction Rating Quality (IRQ)	4.19	3.96	2.29	0.035
	Salesperson Listening - Satisfaction	**6.50**	**5.93**	4.56	0.000
	Salesperson Listening - Anticipation	6.43	6.02	2.08	0.050
	Hedonic Quality - Stimulation	**4.33**	**2.97**	5.97	0.000
	Hedonic Quality - Identity	4.11	3.50	2.40	0.028
	Attractiveness	**4.36**	**3.42**	4.07	0.001

Table 17 Summary of significance test results for the selected measurement instruments. Differences with strong significance ($p<0.01$ in a two-tailed, paired t-test) are marked in bold.

4.2 Feedback from Advisors

Advisors' feedback is not as enthusiastic as that from advisees. Measures of satisfaction (YST) or pragmatic quality do not provide significant results and means differ by less than 0.1 on a 5-point Likert scale. Accordingly, the service quality remains on the same rather high level (YST: 4.30 for LivePaper vs. 4.23 for conventional, pragmatic quality: 3.72 vs. 3.76). The IRQ does not yield significant differences either (3.93 vs. 4.03 from 5). However, according to the Attrakdiff scale, the advisors see an increased attractiveness, identity and stimulation as the primary effect of LivePaper (Figure 27). When asked which of the advisory settings they would prefer, 4 advisors clearly prefer LivePaper and only two are indifferent; none of them choses the conventional advisory service. Overall, advisors primarily see LivePaper's potential for addressing advisees' emotions, being an essential element in high-touch services, but do not notice differences going beyond that.

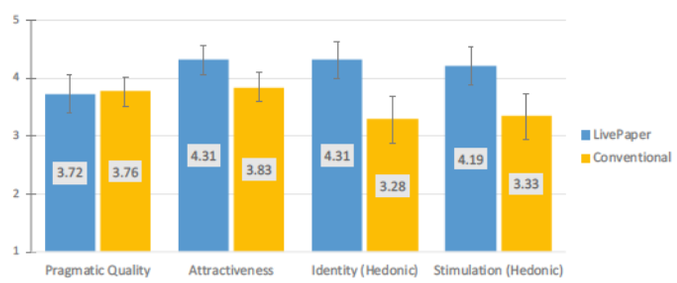

Figure 27 Average advisors' assessment of the advisory settings for the sub-scales of Attrakdiff (Hassenzahl et al. 2003) (blue – LivePaper, yellow – conventional, error bars: 95% CI). Max and min values are given on the y-axis. T-test (two-tailed, paired) values are as follows: attractiveness – $t(17)=2.74$, $p=0.009$; hedonic quality – identity – $t(17)=4.05$, $p<0.001$; hedonic quality – stimulation – $t(17)=3.41$, $p=0.002$.

Analysis of the interviews makes clear, that the advisors try to assess the potential of LivePaper against their extended practice experience, thus providing a differentiated picture. An advisor makes clear that she needs her freedom of choosing the right advisory service tools: "I think, the new consultation with the live paper – so, I really loved it and as I said, I'm open to it, if it generates added value. It felt very well. Sure, one will always have handling issues at the beginning. That takes a few times until one is well versed in it. But I think if you have a target, it can be a good thing. It also depends on who you are

sitting in front of you, if you have an Italian customer, or one of a different nationality, or even German, then it will be difficult. Then, I need the freedom of switching to the classic version." The general tone sees LivePaper as helpful if it comes to structuring the encounter, but the structure should be adequate, such that the advisors identify with it: "I think there is a clear thread through the encounter [with LivePaper]. In classical services, you have more breaks and, depending on how you designed it, the clear thread is not always recognizable. By contrast, with LivePaper, the structure is clearly recognizable. Which property is it? (…) And then you come to the different models you can show. But you are more tied to the process. In the classic model, on the other hand, you are more flexible. (…) It is not like I felt forced to follow this process. I did not feel urged. I think that LivePaper offers a clearer structure, especially in the end. Beautifully targeted, chop-chop-chop. I did not have to pretend (…) it felt natural to me". Additionally, the advisors value the visualizations as well as the opportunity to directly address the emotionally-loaded content with LivePaper: "In trainings, one gets taught to focus on emotions. (…) [The house token] is a good start, because, in my opinion, your [client's] thoughts are with the house at that moment. With LivePaper you can better imagine it and everything. If you just start talking and messing around with numbers, that's certainly not a pleasant start, as if you visualized it." However, the advisors are also aware that impression management remains an issue with LivePaper too; one person even stresses that it may be more important, because the client's attention is divided between the system and the advisor, thus leaving less time for impression management: "I think, if you use the system, the first impression of the consultant is even more important than if you make it the conventional way. Because the client focuses already more on the system than on the advisor herself. So, if he's focused on her, this moment gets just more important. Yes… but I think it can also be cool." Overall, advisors explain their assessment from the background of their daily practice rather than one-time experience and acknowledge LivePaper's positive impact on the personal interaction.

5 Discussion

5.1 LivePaper as an Interface between the Physical and the Digital World

This manuscript summarizes a design study oriented at improving financial advisory services by means of IT with a tangible pen-and-paper interface. The evaluation results demonstrate that IT does not have to disturb the interaction between the interlocutors or de-humanize the encounter to make the collaboration more effective and enhance the service quality. On the contrary, LivePaper contributes to the advisee's satisfaction with the interaction and, particularly, with the way, the advisor listens to him, while enhancing pragmatic qualities as well. This sets this study apart from the previous efforts to support advisory encounters, where the interaction suffered from the presence of an IT tool: we show how to break a trade-off between quality aspects like transparency or pragmatic value of an encounter and the personal interaction (Schwabe and Nussbaumer 2009; Heinrich et al. 2014a; Kilic et al. 2016). LivePaper overcomes this issue by providing action offerings of either character: First, the system supports practices and behaviors already existing in the financial advisory services (positioning papers next-to-each-other on the table for comparison). Second, it offers new behaviors aligned with the major rationale behind the existing material practices. Moving beyond supporting the existing practices and visible behavior to address the implicit rationales was essential for acceptance from

the advisors: primarily through those new elements they were able to see additional value generated by the LivePaper, i.e., the enhanced stimulation, identity, and attractiveness.

The fact that the interaction relies on material used in collaboration for ages, generates an advantage. First and foremost, advisors employ tools that fit the script model of advisory services: most people expect an advisor who takes notes and listens carefully, and LivePaper can provide this experience – it provides pen and paper, i.e., tools many people expect to play a role in an advisory service. This follows the intention listed in Table 16 as P2 (Write) and is in line with calm design (Weiser and Brown 1996). Natural, expected interaction methods allow for bringing user's attention back to the content and away from the technology itself. Additionally, advisors choose which modules or functionalities to use – the choice remains implicit though: taking the pad with a piece of paper and writing on it launches the handwriting recognition, positioning a marked sheet in the middle of the table launches recognition of related gestures and the adequate visualization. However, there is no requirement to do the one or the other. This is central for the advisors' feeling of control (Schwabe and Nussbaumer 2009; Nussbaumer et al. 2012): since there is neither a visible process representation, nor a strict sequence to be followed, disturbing coercion effects could be prevented (Kilic et al. 2015, 2017) and the advisors were free to employ practices they established over years (cf., P1 - Impress, Table 16). Merging the mixed-reality modes in combination with calm design generates a satisfactory experience: it allows for conducting an encounter oriented at the needs and expectations of a particular advisee and the modus operandi of different advisors, thus bringing the human back into the IT-supported encounter.

The opinions collected from the advisees, assessment of information transparency as well as positive effects of LivePaper on the subscales from the Salesperson Listening instrument, provide a solid evidence that the advisors' actions were accountable (Dourish and Bellotti 1992; Dourish 2001), i.e., the advisees could follow and understand advisors' actions. Dynamically changing visualizations necessarily contribute to this feeling and advisees often explain, the simply could see things, which made the whole topic clearer to them, as intended by P3 (Visualize) in Table 16. However, advisees report that based on the advisors' actions with LivePaper, such as using the dial ("screw"), they could establish an even more comprehensive picture of the mortgage and its components, as intended by design principle P5 (Shape). This confirms the potential of TUIs for illustrating causal or dependency links between abstract entities (Marshall 2007; Schneider et al. 2015), even beyond the educational context. Given the promising results concerning learning in advisory encounter based on sensory experience (Heinrich et al. 2014b), we argue for digital tangibles as adequate extension of conventional advisory tools. However, tangibles did not only contribute towards the pragmatic value. As advisees report on the pleasure related to investigating the location of 'their' future property and advisors opinions are in line with that, tangibles do not stand only for abstract concepts, but also generate emotions (Xie et al. 2008) and attract collaborators' focus (Schneider et al. 2015), as intended in P4 (Incite). Since emotions and involvement play a central role for relationship building (Novak and Schmidt 2009), using digital tangibles to generate those emotions produced the expected effect. When summarizing the encounter, many advisors positioned all used tangibles and pieces of paper (including some with augmented visualization) in the middle of the table. Opinions from the advisees make clear, that they liked this closure, because it again created an overview and brought the information together independent of medium. As discussed, the strength of LivePaper resides not so much in introducing novel interaction paradigms, but in

bringing together various concepts from mixed reality, combining them in a coherent manner oriented at co-located collaboration, and adapting them to fit the advisory scenario based on previous research in this domain.

5.2 LivePaper for Advisory Practices

We observed that the second source of LivePaper's positive impact on the advisory services lies in the orientation at existing practices and, particularly, the rationales behind those practices. Interestingly, both, advisors and advisees, express the feeling, that LivePaper supports their goals and advocates their interests: advisors say it helps approaching emotions and making the right impression, being a central rationale according to previous research (Dolata and Schwabe 2017c), advisees get a better overview and a transparent service. However, the advisors emphasize the fact, that LivePaper needs to fit their way of dealing with clients, their idea of the process, as well as their practices for maintaining the right impression – advisors acknowledged that streamlinig the process with LivePaper was easier and that the resulting structure reflected their normal practice. This includes also the possibility to employ LivePaper only in specific episodes or start with LivePaper and continue with conventional advisory service if preferred. Live Paper does not enforce a process – neither an abstract process postulated in literature (Oehler and Kohlert 2009) nor a process elicited through fieldwork, but provides means for structuring the process by gestures for interacting with paper or tangibles, that serve as activity shift markers. This is essential: whereas *designing for practices* (Wulf et al. 2011; Schmidt and Bannon 2013) is often taken as *designing for existing behaviors* or *designing for intended behaviors*, thus approaching surface activities, we argue that the term needs to be understood in terms of *designing for rationales behind practices*. This follows from the character of collaborative practices as routinized behaviors (Schegloff 1986) that implement institutional scripts and roles (Drew and Heritage 1992a; Svennevig 2001; Heath and Luff 2011), as well as a person's standing concerning more general public or political discourses (Scollon 2001). If the actions afforded by the system are not aligned with those rationales, the usage causes dissonance and, hence, denial of the system. Further, if the system supports solely the existing surface behaviors – the observable actions – it may also get refused if the user feels, it complicates the situation, adds complexity, or the user simply feels, she can conduct the action equally good without the system. The latter may be an actual problem during the appropriation phase, when it is quite natural that users stick to their routines and try to establish an understanding of the system against their routines.

This issue gets particularly important in advisory services and other institutional encounters, where the user of the system, mostly the advisor, is under pressure: she wants to conduct the service in a professional and swift manner, she does not want to lose face in front of the advisee, and she may not see an added value of using a system that mimics her behavior anyway (Schwabe and Nussbaumer 2009). LivePaper provides support for existing behaviors, like clear activity shifts through moving material, positioning offers parallel to each other, etc. (Dolata and Schwabe 2017c), but also affords new behaviors aligned to the essential rationales behind practices of financial advisors, such as making the desired impression on the client (Dolata and Schwabe 2017c), binding him in an engaged discussion for rapport building (Heinrich et al. 2014a; Dolata and Schwabe 2017b), or transfer of specific knowledge about offered products (Mogicato et al. 2009; Nussbaumer et al. 2012; Heinrich et al. 2014b). We claim that previous systems for financial advisory services remained a niche because they ignored the "pencil-selling"

(Thiele 1999) character of financial advisory services and the fact that using simple means fosters relationship building. LivePaper leverages this paradigm while adding value for the advisor (e.g., additional tools for addressing emotions and capturing attention) and for the advisee (e.g., clearer and more transparent visualizations and better interaction with the advisor).

6 Limitations and Conclusions

The encounters supported with the LivePaper have potential to generate value for the advisor, for the advisee and for the organization, i.e., the bank. This study shows that LivePaper has potential to make the advisory services more human, while improving the general satisfaction with the service. In the highly competitive financial markets, banks need to reconsider their strategies, including channels for advisory services. The results show that there is large potential for improving personal services regarding their general quality, as well as their attractiveness and fun factor expressed by hedonic qualities. Consequently, before employing robo advisors and forcing the client to self-service, banks should reconsider their existing resources and improve them. This may include empowering the employees with new technologies but also new incentives structures for advisors, such that they are incentivized to provide the best possible service rather than selling the most. Tools that support transparency and help the client understanding the complex products but keep the high-touch character of an encounter, seem to be a reasonable way to go.

The results do not come without limitations. Clearly, the system still lacks many functionalities and flexibilities necessary for application beyond the scenario of first encounter about a mortgage. Therefore, extending the functionality and testing the system in other advisory encounters, within and outside financial domain, would be necessary for generalizing purposes. Furthermore, a longitudinal field study, where the advisors use the system in their daily work (as opposite to the design experiment), could provide further insights and confirm the value of the LivePaper-supported advice in the real world. This could also strengthen the external validity of the evaluation. The small n of test participants allows for observation of strong effects only where all subjects exhibit the same tendency. Enhancing the n and varying the scenario even further could confirm the observed effects, point to weaker ones, and provide further insights about the applicability of LivePaper in the envisioned domain. However, experiments with real advisors generate high costs for the industry partners (approx. 1.5 day per advisor) and for the research partners, who require additional personnel for supervising the study. Consequently, limitations in this regard result from monetary circumstances and the presented n was agreed on in the very beginning of the project as adequate for a proof of value. The presented experiment compares the LivePaper treatment with the conventional one, i.e., one that represents status-quo in the MoBa. Comparing against advisory services supported with other means (be it the niche, off-the-shelf products or research prototypes) would necessarily produce more insightful results; however, market research and benchmarking was beyond the scope of this project. Still, the MoBa's status-quo is shared among many financial services providers and has even its own denotation in service science and marketing: "pencil selling". Therefore, we argue that LivePaper could contribute to higher quality services in a whole branch. A further limitation of this manuscript is the sparse description of the technology used for LivePaper and challenges that occurred during the development: we intend to author a separate article that

summarizes the encountered issues and the technical solutions. The current manuscript's purpose was to analyze the user perspective and not the technical matter. Overall, the limitations of this study are typical for design research.

The current study offers a major improvement concerning the support of advisory services in financial institutions and beyond. Designers working on enhancing frontline services can find inspiration for using TUI and PPUI in their designs, understand the reason for including paper and other tangibles in the design, and receive further guidance on their impact. HCI researchers investigating role of tangible interfaces receive deep and insightful analysis of a particular (but to many HCI researchers, an exotic) domain where tangibility plays an essential role and can benefit from the results that confirm the applicability of pen-and-paper and tangible interfaces beyond the hitherto focus on creative and design work. CSCW as well as IS researchers concerned with service encounters and institutional talk gain access to a set of promising design principles: LivePaper can be used as a framework for further, focused applications addressing more specific challenges in the advisory scenario without the risk of destroying the subtle interpersonal layer. Improving the interaction and making the encounter more human-centered can go hand-in-hand with improvements regarding pragmatic and general service quality.

CLOSURE

Where does the story go?

Author: Mateusz Dolata

Advisory services are a fascinating field of research, where institutional interaction mixes with collaboration, impression management meets persuasion, and where conversation analysis unveils technical problems in the design. Over the last years, I was confronted with opinions predicting advisory services to disappear due to the self-service but also with arguments that their impact may grow due to the increasing complexity of individual situations. I, also, encountered opinions which discredit and question advisors' ability to respond adequately to this complexity in a rapidly changing world. If one was asked to suggest a mortgage loan for 20 years, which model is the most appropriate? If one was asked to recommend a security system that is and will remain compatible with smart home appliances for the next 20 years, which one fits this need? Advisors are confronted with difficult questions like these each day – of course, in most cases they are not formally responsible for advisees' decisions, but even formulating a halfway reasonable answer to those questions seems like a challenge. But maybe advisors' role goes beyond producing answers: advisors can identify implicit intentions behind such questions and help the advisee dealing with those. Through my research, I could experience that the work of an advisor exceeds the information collection and the provision of a recommendation.

However, the advisory services need better equipment for the upcoming times of complex questions and issues. Early in my PhD studies, I learned from my colleagues about a trade-off that results from presence of IT in advisory encounters. While some things get better because of IT (like information transfer), others may get worse – be it according to the interviews or other measurements. The first two articles point to an exemplary trade-off: tuning in phase gets longer and less effective, but afterwards the reciprocity and interactivity gets better. The third article described problems from the profiling phase, but because the advisors collected all relevant information and entered it into the tool, they could generate better overviews and documentation later on – again a trade-off: better documentation for an unnatural profiling conversation. Similar results are reported outside IMRG too. For instance, in doctor-patient encounters, working with a computer during an encounter resembles filling out a boring form, but this helps for the records and further processing (Pearce et al. 2008). Overall, my early research and research of my colleagues suggested that IT generates losses and gains, and one of the design aims was to distribute them accordingly.

This was leading to unpleasant dilemmas as I joined the group: what can be sacrificed and what can one get for it? Part of the problem was the framing: advisory encounters were treated as a whole – an approach this dissertation tried to approach and change. It proposes to see advisory services as a complex system of behaviors – some routinized and some spontaneous. Whenever one considers an experience, e.g. an encounter, as a single entity, a whole, he or she tends to use holistic analyses and global measures. However, as Kahneman (2011) points out, subjects asked for a general assessment of an activity or

experience, e.g. for the assessment of an encounter, tend to consider the most extreme moment and the final moment rather than building a comprehensive picture of the experience. Consequently, the questionnaire-based global measurements and holistic comparisons between conventional and IT-supported advisory services, dominating in earlier works, were good approximations but, certainly, did not offer a complete picture. In particular, efforts to improve an aspect in advisory encounters and, simultaneously, generate a large, globally-measured effect were often ineffective. For instance, efforts of me any my colleagues to improve customer orientation through more effective client profiling did not generate the expected overall improvement. Of course, there are probably many reasons, but, in line with Kahneman (2011), one issue is the following: client profiling activities occur towards the beginning of an encounter and are unlikely to generate a negative or positive "wow" effect, thus they probably cannot influence global aspects significantly enough. Considering advisory services as combination of practices and behaviors allows for better observations, helps asking the right questions during the interviews, and, eventually, choose adequate aggregate measurements. We require questionnaire-based instruments: they remain a good compromise if it comes to intrusiveness and effort needed to produce an answer. However, interpretation of results should be more careful - the illusion that changing a button somewhere in the prototype generates global effects is misleading. In fact, according to Kahneman (2011) this may occur only if the new color of the button generates an outstandingly positive or negative episode or if it is the last thing the advisee or the advisor will see. Approaching the advisory services from practice perspective allowed to remove the trade-off thinking and build IT for improvement of practices rather than for abstract, global improvements. This approach was essential for the design of LivePaper and for user training in burglary prevention scenario: at the end, this way produced some global improvements as well.

It is essential to foster design and development of digital tools for advisory services without trade-offs. Advisory services will deal with increasingly complex cases, such that the advisors will benefit from more advanced digital features, like automatic inference from collected data or extended search for optimal or alternative recommendations. At the same time, the human abilities to collaboratively analyze the situation to make it understandable and acceptable and explaining the solution in advisee's terms will remain a valuable asset. Furthermore, the increasing regulatory expectation towards customer protection or data safety, will add formal complexity to the encounter and generate additional work (Kremer 2018), which can be reduced with a computer. For instance, a computer could help generating documentation based on the artifacts produced in the encounter, an automatic transcription of the conversation, and the notes created by the advisee and the advisor. Hybrid approaches seem appropriate in the areas where typical human abilities of empathizing and understanding implicit messages can get complemented with computer-based analysis of large amounts of data and ad-hoc inference enabled through in-memory computing, speech recognition, and access to unlimited sources of knowledge. Nevertheless, given the main point of this dissertation, important questions occur: How should the system interact with the interlocutors during the encounter such that it remains natural? How to design this interaction in a way that is consistent with the material conduct and the practice rationales? Could digital agents generate novel, unintended trade-offs? What transformation effects can be expected after introduction of intelligent agents into advisory services? The systems developed so far followed the idea of a support system as a tool, but what will change if we design digital agents to enter the advisory service?

Even without a trip into the future, this dissertation leaves open numerous questions. The insights collected in the areas of burglary prevention and financial advice provide a consistent picture and a coherent set of results. Nevertheless, it remains open whether transferring the practice-based approach to doctor-patient or unemployed center encounters will produce similar effects – upcoming research projects in the IMRG approach those areas and let hope for answers to come. It is of great importance to understand what rationales drive doctors, nurses, or unemployed advisors during their daily work, what routines and what material circumstances form their behaviors. Similarly, the dissertation could not answer the question on the transferability of the developed systems to other application domains: Does LivePaper usage generates consistent results in investment advice or in insurance encounters? Does tablet software like SmartProtector suffice in stationary setting? How much will the short-term IT development shape the demand for specific technologies in advisory services? One can envision an advisory service ecosystem consisting of digital tools, digital agents and skilled humans who complement each other during service provision. However, it remains open how to handle intersection between elements of such an ecosystem and the human conduct. Overall, the studies presented in this dissertation managed to create a base for further transformation in advisory services, but each answer generates a range of new questions. CSCW, IS and service science researchers should join the common effort to improve advisory services and, in general, institutional collaboration.

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Work Experience

Since December 2012

Department of Informatics, University of Zurich, Zurich, Switzerland

Research Assistant	*Teaching and research activities*
Teaching Assistance	Computer Supported Cooperative Work (2013-2016) DesignThinking@HSG (2013-2016)

October 2011 to March 2012

Institute of Computer Science, University of Bonn, Bonn, Germany

Student Assistant	*Tutoring activities and support of research*
Teaching Assistance	Advanced Topics in Information Systems: Information Retrieval (2011), Java BootCamp (2012), Python BootCamp (2011)

October 2008 to December 2009

Cluster of Excellence "Asia and Europe in a Global Context", University of Heidelberg, Heidelberg, Germany

Student Assistant	*IT Support and Development*
Tasks	Administrative tasks, end user support, development of software components for automatic parsing of semi-structured input

February 2009

Alliance Technology Polska Sp. z o. o., Poznań, Poland

Intern	*Web Development*
Tasks	Design and implementation of a prototype of the company homepage

July 2007 to September 2007

Powszechny Zakład Ubezpieczeń na Życie Spółka Akcyjna, Leszno, Poland

Support employee	*Database updating*
Tasks	Controlling and digitalization of insurance documents